Popular Geopolitics: The construction of the climate change issue by South African online news media

by

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Declaration

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March 2021

Abstract

In 2020 the reality of climate change has become glaringly evident, with increasingly frequent and intense impacts being felt all around the world. The issue of climate change is now, more than ever, not only the concern of the scientific community but also of international leaders, politicians, policymakers and the wider public. Still, climate change is a particularly complex issue that cannot be understood in its entirety by the layman. As noted by Mike Hulme, because 'climate' cannot be experienced directly, our understanding of *climate change reality* is constructed (Hulme, 2009: 43). This reality is constructed by various actors through discourses, frames and narratives.

Literature in the field of geopolitics, specifically popular geopolitics, shows that the way in which issues of concern are constructed by 'popular sources' such as online news media play an important role in affecting high politics by producing a 'common sense' understanding of the issue at hand. This, in turn, manufactures consent for actions by geopolitical actors and policymakers. With the above in mind, this study investigated the construction of the climate change issue in South African online news media.

Making use of framing theory, this study determined how the climate change issue was constructed by South African online news media during December 2019, the month of the COP25 conference. Guided by the work of O'Neill *et al.* (2015) and supplemented by Dryzek (2013), the researcher qualitatively coded a sample of online news articles from the top 3 South African online news websites to determine the presence or absence of an *economic* and *disaster* frame. These two frames were chosen as they fit neatly with several environmental discourses, thus enabling the researcher to situate the findings within the literature on environmental geopolitics. Overall, this study found that South African online news media have constructed climate change as an issue that warrants fear and concern, whilst placing 'business-as-usual,' reformist solutions at the forefront of their discussions.

Opsomming

In 2020 het die realiteit van klimaatsverandering duidelik geword en die toenemende ernstige gevolge daarvan word wêreldwyd waargeneem. Die kwessie van klimaatsverandering is nou, meer as ooit te vore, nie net ‘n saak van kommer vir die wetenskaplike gemeenskap nie, maar ook internasionale leiers, politici, beleidmakers en die breë publiek. Klimaatsverandering is by uitstek ‘n ingewikkelde saak wat ‘n oningewyde mens nie maklik ten volle kan verstaan nie. Soos opgemerk deur Mike Hulme, omdat 'klimaat' nie direk ervaar kan word nie, word ons begrip van *klimaatsveranderingsrealiteit* gekonstrueer (Hulme, 2009: 43). Hierdie realiteit word deur verskillende akteurs saamgestel deur middel van diskoerse, raamwerke en vertellings.

Literatuur op die gebied van geopolitiek, en meer spesifiek gewilde geopolitiek, wys dat die manier waarop hierdie kwessies deur 'gewilde bronne', soos aanlyn-nuusmedia, saamgestel word 'n belangrike rol speel om hoë politiek te beïnvloed deur 'n 'gesonde verstand'-begrip van die toonaangewende kwessie te skep. Dit gee gevolglik verdere toestemming en motivering vir geopolitieke akteurs en beleidmakers om aksie te neem. Met die bogenoemde idees in gedagte, het hierdie studie die konstruksie van die klimaatveranderingskwessie in die Suid-Afrikaanse aanlyn-nuusmedia ondersoek.

Deur gebruik te maak van raamwerkteorie, het hierdie studie bepaal hoe die kwessie van klimaatsverandering gedurende Desember 2019, die maand van die COP25-konferensie, deur Suid-Afrikaanse aanlyn-nuusmedia saamgestel is. Begelei deur navorsing van O'Neill, *et al*. (2015) en aangevul deur Dryzek (2013), het die navorser 'n steekproef aanlynnuusartikels van die top 3 Suid-Afrikaanse aanlynnuuswebtuistes kwalitatief gekodeer om die aanwesigheid of afwesigheid van ‘n *ekonomiese* en/of *ramp* raamwerk te bepaal. Hierdie rame is gekies omdat dit van toepassing is op verskeie omgewingsdiskoerse, wat die navorser toelaat om die bevindinge binne die konteks van die literatuur oor omgewingsopolitiek te plaas. Hierdie studie het algeheel bevind dat die Suid-Afrikaanse aanlynnuusmedia klimaatsverandering gekonstrueer het as 'n kwessie wat vrees en bekommernis regverdig, terwyl ‘n 'besigheid-soos-gewoonlik' gesindheid aan die voorpunt van besprekings oor hervormingsoplossings geplaas word.

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"Sometimes you think you know things, know things very deeply, only to realize you don't know a damn thing."

— Jandy Nelson, I'll Give You the Sun

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1 Introduction

1.1 Introduction to the Study and Background

Repercussions of changes in the climate have been observed for centuries; however, the acknowledgement that these events emanate from a common cause was only brought to light as a result of climate science (Dryzek, Norgaard & Schlosberg, 2012: 2). In 1859 John Tyndall demonstrated how methane carbon and carbon dioxide absorb heat radiation, ultimately controlling the temperature of the Earth's surface air (Pittock, 2005: 245). It was not until 1985, at a conference sponsored by the International Council of Scientific Unions, the World Meteorological Organisation and the United Nations Environmental Programme (UNEP), that the first scientific warning about global warming and climate change was issued.

Climate change is now understood as the increase in global mean temperatures over the last fifty years and the ecological effects of this temperature increase (Fiorino, 2018: 6). There is scientific consensus that this increase in global mean temperatures has resulted primarily from human combustion of fossil fuel, but also from increased atmospheric concentrations of carbon dioxide, methane, nitrous oxide and fluorinated gases as a result of anthropogenic activity (Fiorino, 2018: 6). Together, these compounds are understood as 'greenhouse gases' (GHG).

Although global temperatures have never been fixed in nature, the unique impact of human activity on the climate as a result of GHGs has rapidly increased the modifications in global temperatures leading to harmful repercussions (Fiorino, 2018: 9). In the 2019 *Climate Action and Support Trends Report* by the United Nations (UN), Parties[1] observed climate-related impacts and hazards such as changes in temperature, rainfall and sea-level rise through indicators such as ocean acidification levels, the status of glaciers, the incidence of extreme weather, and relations between regional and national climate conditions (United Nations Climate Change, 2019: 11).

Climate change is a pressing concern as reported global temperature trends are unprecedented and have been rapidly rising over the last few decades (Pittock, 2005: 2). Thus, the international community has reached a "crucial turning point in debates around climate change" (McCarthy et al., 2014: 665). Concerned reports by the Intergovernmental Panel on Climate Change (IPCC) have detailed this 'crucial turning point' with warnings that a global temperature rise of 1.5° Celsius will have dire effects on natural *and* human systems (IPCC, 2018). For this

[1] 'Parties' refers to states forming part of the Congress of the Parties (COP).

reason, landmark international agreements such as the Paris Agreement have been instituted to strengthen efforts to address climate change.[2]

Although disputes around the scientific certainty of the existence of man-made climate change have generally been settled, matters are complicated when challenges such as *positive feedback loops* and *tipping points* are brought into the mix (Mccarthy, Chen, López-carr, Louise & Endemaño, 2019: 666). Positive feedback loops arise when the effects of climate change further reinforce climate change (such as when the melting of permafrost increases carbon emissions). Tipping points refer to incidents when certain climate-related thresholds are breached, triggering irreversible and cascading shifts (Fiorino, 2018: 10). These challenges increase uncertainty about climate-related repercussions as they are hard to predict.

Nonetheless, reports by the Institute for Public Policy Research (IPPR) fittingly characterise the prospects of climate change as a 'risk multiplier' (Laybourn-Langton, Rankin & Baxter, 2019: 20). This means that repercussions are sharply multiplied when climate change-related events are compounded with other pressures such as population growth, inequality, global demands for food and water, and weak institutions (Laybourn-Langton *et al.*, 2019: 24). The New Climate Peace Report has identified seven compounded risks: local resource competition; livelihood insecurity and migration; extreme weather events and disasters; volatile food prices and provision; transboundary water-management; sea-level rise and coastal degradation and unintended effects of climate policies (Rüttinger, Smith, Stang, Tänzler & Vivekananda, 2015: viii-x).

The sheer scope and reach of the predicted ramifications of climate change have captured the attention not only of scientists, but also of politicians, policy-makers, mass media and civil society. Additionally, these reports have invoked feelings of *ecoanxiety*[3] and fear, along with uncertainty.

Responses to the findings of climate science have taken form in international treaties, national frameworks, non-governmental campaigns and civil protests. Furthermore, these responses have been widely documented, deliberated, debated and framed by news media, social media

[2] The Paris Agreement: "The Paris Agreement builds upon the Convention and for the first time, brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects" (UNFCCC, n.d.)".
Nationally Determined Contributions (NDCs): "The Paris Agreement requires all Parties to put forward their best efforts through nationally determined contributions (NDCs) and to strengthen these efforts in the years ahead" (UNFCCC, n.d.).

[3] Ecoanxiety refers to anxiety regarding "the dire state of the climate and biodiversity" (Lawton, 2019).

and popular media. It is through these media platforms that the nature of climate change is then communicated to civil society at large. Media platforms thus play an important role in mediating the complicated climate change issue to everyday people, therefore tempering their perception of the reality of climate change.

1.2 Research Problem and Objectives

Climate change is a serious problem for the planet, if not the *only* serious problem (Chaturvedi & Doyle, 2010: 207). The issue of climate change has received significant international and domestic attention and has been presented as a major political problem – not just the concern of the scientific community (Shehata & Hopmann, 2012: 175). In his seminal paper, Mike Hulme argues that because 'climate' cannot be experienced directly, our understanding of *climate change reality* is constructed (Hulme, 2009: 43). The reality of climate change is thus constructed by various actors through discourses, frames and narratives.

This concept of a 'constructed' climate change reality shares many conceptual underpinnings with critical geopolitics. Prominent geopolitical scholars such as Dalby have noted that knowledge and perspectives are not neutral and, therefore, the way that environmental issues are approached is contingent on specific narratives or frames (Dalby, 1998: 180). In other words, critical geopolitics calls for an enquiry into the narratives and frames that 'construct' the representation of issues. These frames may thus form pieces of a broader environmental discourse or perspectives, such as 'problem solving,' 'sustainability' or 'survivalism' (these discourses are discussed in more detail in Chapter 2).

Situated in the field of 'popular geopolitics' (an offshoot of critical geopolitics), the news media and online news media have undoubted played a crucial role in 'constructing' a climate change reality through the use of various 'frames.' This notion is especially relevant in the age of digital media when most of what we know about what is happening in the world is gleaned from online sources (Hamilton, 2016: 5). McFarlane and Hay have noted that, conceptually, media frames and geopolitical scripts "organise and structure information in ways that engender particular interpretations of events" (McFarlane & Hay, 2003: 217). Glassner (1999: 301) and Furedi (2002) have similarly posited that the 'culture of fear' is in part due to the media's obsession with and disproportionate focus on 'catchy one-liners,' rather than the escalation of 'real riskiness' (Glassner, 1999: 301; Furedi, 2006). In other words, media frames form part of geopolitical scripts and play a role in constructing a specific climate change reality.

Jutta Weldes explains why 'popular culture' representations are important for world politics. Texts such as news media contribute towards the production of 'common sense' through the reproduction of dominant discourses and thus 'manufacture consent' for policy (Weldes, 1999: 119). McFarlane and Hay accordingly argue that "dominant geopolitical actors map out lives and practices on a terrain on (inter)national consciousness – a hegemonic 'common sense' – to which they and the mass media, through their representational practices, have contributed" (McFarlane & Hay, 2003: 229).

Mass media shape the landscape of 'high politics' and thus it is important to understand how this 'common sense' about climate change is being constructed by news media. This study accordingly seeks to uncover the framing of climate change in South African online news media[4] and therefore ascertain how the issue has been 'constructed.'

Through a textual content analysis of online news media, this study seeks to answer the following question: "How did South African online news media construct the climate change issue during December 2019?" It is important to note that 'construction' in this research question refers to the frequency and presentation of the frames in the articles analysed. In this way, the researcher takes on the notions of critical geopolitics by critically analysing the representation of climate change in South African news media.

1.3 Relevance of the Study

Climate scientists agree that the world is currently witnessing the effects of climate change through extreme weather, water scarcity and rising sea levels (Laybourn-Langton *et al.*, 2019: 7). Furthermore, these effects will continue to occur at unprecedented levels of frequency and intensity, resulting in a smaller window of opportunity for society to avoid catastrophic outcomes (Laybourn-Langton *et al.*, 2019: 14).

The issue of climate change is of particular relevance for South Africa. The country lies within a drought belt and has a large economy dependent on climate-sensitive sectors such as agriculture and forestry (UNDP, n.d.). Climate change thus poses a risk to South Africa's water resources, food security, health, infrastructure and ecosystem services and biodiversity (Ziervogel, New, Archer van Garderen, Midgley, Taylor, Hamann, Stuart-Hill, Myers &

[4] The terms 'South African online news media', 'South African news media' and 'South African media' will be used interchangeably throughout this study and all refer to South African online news media.

Warburton, 2014: 606). These risks are compounded further considering South Africa's high levels of poverty and social inequality (Ziervogel *et al.*, 2014: 606).

In addition to the impacts of climate change, Fiorini notes that in democracies (such as South Africa), issue framing poses one of the greatest challenges to governing climate change (Fiorino, 2018: 80). Herein, the framing of climate change is a democratic issue for two reasons. Firstly, in a democracy, justification of political action relies on mobilizing public support (Nelson & Oxley, 1999: 1040). Secondly, in confronting a complex issue like climate change the way in which the issue is represented or 'constructed' plays a vital role in the way that everyday people, national and international actors define, debate and contest it.

It is clear that climate change will impact on South Africa and that the way in which the issue of climate change is represented will play a role in shaping responses to it. Thus, it is imperative to gain more understanding of how South African media have constructed climate change and what assumptions these framings convey in understanding a more objective climate change reality and thus responding adequately.

1.4 Preliminary Literature Review

This study argues that the representation of issues such as climate change is never neutral. It therefore seeks to critically analyse how climate change has been constructed in South African news media by gaining more understanding of the frames used when they report on it. This study thus draws from the field of 'geopolitics' with specific reference to a 'critical' understanding of geopolitics by 'popular' geopolitical actors in terms of 'environmental geopolitics.' This section provides a brief overview of the literature that will be discussed in more detail in Chapter 2.

1.4.1 Geopolitics

The term 'geopolitics' is popularly used to describe the interface between international relations and geographies (international border disputes or geographical patterns of election results); however, it is also a distinct field of academic study (Agnew, 2003: 5).

The academic study of geopolitics examines the spatialized perspectives, geographical representations, rhetoric and practices that underpin world politics (Agnew, 2003: 5; Flint, 2017). Geopolitics involves a multitude of actors (state leaders, policymakers, mass media, etc.) and can be divided into two broad approaches (Dodds, 2007).

The first approach, classical geopolitics, conceptualises geopolitics as a guide to state relations (Dodds, 2007: 4). The second, contemporary approach developed from classical geopolitics and encompasses critical geopolitics and feminist geopolitics. These approaches examine how representations, framings and labels of global relations shape understandings and perceptions of global relations (Dodds, 2007: 4).

The study and development of classical geopolitics as a field is largely a product of historical context, while contemporary approaches have developed as a result of various conceptual points of departure. To understand the basic tenets of classical geopolitics, it is thus necessary to locate it historically.

The formal establishment of geopolitics as a distinct subject is a product of the anxieties around economic nationalism and colonial expansion of the 19th century and the search for a theory that explained why some empires succeeded and others failed. In light of this political and economic climate, notable scholars such as Rudolf Kjellen, Friedrich Ratzel and Sir Halford Mackinder rose to prominence, garnering widespread support for their work in unveiling the 'objective science' of politics.

These scholars sought to create a 'scientific' and objective understanding of why states flourished, struggled, cooperated and waged war on one another. Following the process of scientific research, they sought to 'apply' the science of geopolitics (or, 'political geography,' before the term 'geopolitics' was coined), exploring the reality of a given geography, before drawing conclusions about its political state (Cahnman, 1943: 56). The power of this supposedly objective science of politics was notably used to justify the actions of German National Socialism and the Nazi party.

After the horrors of the Holocaust came to light, 'geopolitics' was viewed with disgust and essentially shut out from academics. The term 'geopolitics' eventually returned to academic writing; however, having learned the dangers of assuming geopolitics as an objective science that could be used to justify horrific state actions. Integral to this was acknowledging the necessity of questioning how issues are framed and why they are represented in a certain way. Thus, central to contemporary forms of geopolitics is a focus on not taking statements of authority as objective truths, and always investigating why and how issues are framed the way they are.

Contemporary geopolitics scholars are divided into two schools of thought: critical geopolitics and feminist geopolitics (a branch of critical geopolitics). Proponents of these schools of

thought understand geopolitics as a means by which to challenge statements of authority and therefore gain more insight into how geographical terrains are constructed and how political action is justified (Flint, 2017: 5).

While classical geopolitics sought to analyse "the way the world is;" critical geopolitics questions "how and why we have come to think of the world in a certain way" (Dittmer & Bos, 2019: 11). Critical geopolitics acknowledges that geopolitical knowledge does not reside solely with the nation-state but also within other sources such as formal institutions (academia, think tanks strategic institutes), the practical (policy-makers, foreign policy, bureaucracy) and the popular (mass media, online media, cinema, novels and cartoons) (Dittmer & Bos, 2019; Dodds, 2007: 45). Feminist geopolitics, on the other hand, builds onto critical geopolitics, widening the lens of enquiry to consider how geography and indeed, geopolitical terrains, interact with politics that is inextricably interlinked to the 'private' everyday experience (Dalby, 1994; Dowler & Sharp, 2001; Hyndman, 2007; Staeheli, 2001).

Critical and feminist geopolitics similarly acknowledge the difference between 'practice' and 'representation.' Flint explains 'practice' as the decisions made by actors and 'representation' as the manner in which problems are framed and thus justified (Flint, 2017: 38). The distinction between practice and representation (and the understanding that these components are interrelated) is essentially what separates critical geopolitics from classical geopolitics. While classical geopolitics focuses on understanding state actions (practice), critical geopolitics argues that knowledge of how and why theses actions are justified (representation) is just as important.

This study draws from the work of critical geopolitics to uncover how environmental issues are represented with specific emphasis on the 'popular' sources of geopolitics. This study therefore requires an understanding of geopolitics and the environment and popular geopolitics. These fields of study will be discussed briefly below.

1.4.2 Geopolitics and the Environment

The environment has been made a topic of geopolitics as it underpins the 'geography' aspect of geopolitical practice and representations (Flint, 2017: 8). The 'challenge' the environment poses, however, is contingent on how the environment is framed. Thus, while some scholars focus on how climate change, for example, may affect the geopolitical landscape, others pay attention to the different ways the 'challenge' of the environment is framed.

Scholars such as Smith (2011), Castree (2003), and Hommel and Murphy (2013) have grappled with the issue of a more interconnected, globalized and 'borderless' world and how this may affect and be affected by environmental issues such as climate change. The environmental challenges of the 20th century are thus characterised as a tension between territorializing (as environmental issues are grounded in territory and specific geographies) and deterritorialization (environmental issue do not abide by state borders or state responses) (Castree, 2003)

These understandings of geopolitics in the light of environmental change set the stage for the various discourses and practices carried out by state and non-state actors in the light of escalating challenges. Taking from critical geopolitical analysis (as discussed under Section 1.5.1.2), much of the literature on geopolitics and the environment examines the various framings of environmental issues and how these affect whose interests are championed and how issues are dealt with. Environmental geopolitics can hence be understood in terms of discourse and practice (Flint, 2017). In his seminal book, *The Politics of the Earth: Environmental Discourses*, Dryzek (2013) shows that environmental discourses can be divided into 'problem solving', 'sustainability,' 'survivalism,' and 'green radicalism.'

The environmental problem-solving discourses take the current organization of the state as a given and environmental issues as a unique challenge to solve. These discourses include theories and subsequent assumptions such as administrative rationalism, democratic pragmatism and economic rationalism. These theories differ in terms of the actors they believe should deal with environmental issues: bureaucracy, institutions of democracy or markets (Dryzek, 2013).

These problem-solving discourses take an anthropocentric standpoint on environmental issues, constructing the environment as a source to provide inputs for the 'socioeconomic machine,' (Dryzek, 2013: 135). Although these discourses put varying emphasis on the importance of scientists, governments and citizenship, they all rely on a liberal, capitalist society for their solutions to environmental issues.

The sustainability discourse, on the other hand, argues for a refinement of how social, political and economic structures work within this framework of industrialized society. The sustainability discourse is manifest in the sub-discourses: sustainable development and ecological modernization. Although these sustainability discourses are similar to problem

solving discourses in that they are anthropocentric, they assume that natural systems are not separate from humanity, but mutually reinforcing (Dryzek, 2013: 156).

The survivalism discourse stands in stark contrast to the problem-solving and sustainability discourses. It is understood as 'radical' as it argues that issues emanating from the environment cannot be addressed with 'business-as-usual' measures and incremental changes like those embodied in the problem-solving and sustainable development approach (Dryzek, 2013).

Survivalist narratives are sustained by scholars such as Homer-Dixon (1996), Kaplan (2001) and Smith (2011), who assume notions such as the neo-Malthusian thesis.[5] These views are widely criticized by scholars such as Obi (1999), Dalby (1996), Furedi (1997) and Smil (1994), who argue that they are racist, incite paranoia and are in general unbalanced.

In the light of the growing concern about climate change, the survivalist discourse has adopted 'securitized' language, thus framing environmental issues as security issues. Scholars such as Redclift (1989), Saurin (1996), Smil (1994), Chaturvedi and Doyle (2010a), Flint (2017) and Dalby (1998) heavily criticize this discourse. Overall, they warn that framing the environment as a security issue places the spotlight on the symptoms of environmental crises rather than the source.

Central to the survivalist discourse are notions of fear and doom. The green radicalism approach, on the other hand, emphasizes a shift in the way in which humans relate to nature as pivotal to dealing with environmental issues. These notions are embodied by the two strands of green radicalism: green consciousness and green politics. While green consciousness focuses on a shift in an individual's mindset for the sake of a higher consciousness, green politics takes this shift in mindset a step further and deliberates on how this could alter political action and structural change (Dryzek, 2013).

[5] The Malthusian thesis, is premised on two opposing natural tendencies: demographic expansion and limited food production. This thesis maintains that these natural tendencies create periodic crises in food supply which are corrected by a reduced population size (through war, epidemics, famine, birth control, abortion and infanticide) (Mellos, 1988: 15).

Mellos describes the neo-Malthusian thesis as sharing the same premise of opposing tendencies but also applying it to "disproportionate rates between technological expansion, consumption of mineral resources, generation of various forms of pollution" and "the earth's limited mineral and fossil reserves and tis limited capacity to absorb pollutants" (1998: 15).

Understanding environmental issues through a critical geopolitics lens uncovers the different ways environmental issues can be constructed. This study focuses on how these constructions are represented in online news media, thus connects to the field of popular geopolitics.

1.4.3 Popular Geopolitics

Popular geopolitics refers to the geopolitical discourse in which citizens are immersed on a day-to-day basis (Dittmer & Bos, 2019: 15). Developed as an offshoot of critical geopolitics, popular geopolitics thus takes into account statements or frames used in popular culture and how they work to construct understandings of spatialized global relations. Overall, popular geopolitics shows how the media influence popular consent and is thus an integral part of a democratic society (Dittmer & Bos, 2019: 15). Saunders and Strukov (2018: 3) thus conceptualize the concern of popular geopolitics as examining and revealing how popular culture articulates political meaning and geopolitical spaces.

On the basis of the above literature review, this study makes use of a critical geopolitics approach to examine the 'geopolitical imaginations' used to mediate the issue of climate change as it is present in popular culture, with specific reference to online news media.

1.5 Framing Theory

As can be gleaned from an overview of the literature on critical geopolitics and the environment, it is important to understand how issues such as climate change are represented through various constructions. Furthermore, the literature on popular geopolitics made clear the importance of 'popular' sources such as online news media in constructing geopolitical imaginations of the climate change reality.

Tools such as critical discourse analysis, narrative analysis and framing theory are often used to investigate how issues such as climate change are constructed. The concept of framing, in particular, is often used to inspect the construction of issues in news media. Thus, it will be adopted in this study.

There is no single definition of 'framing'; however, there are several characteristics that are central to this theory. A prominent scholar in this field of study, Robert Entman, posits that "framing refers to the deliberate or unintentional deployment of specific properties of a news narrative which encourages people perceiving and thinking about events to develop particular understandings of them" (Entman, 1991: 7). Through the repetition and reinforcement of words and images, framing makes some ideas more visible than others (Entman, 1991: 7).

Framing theory is thus a fundamentally *constructivist concept,* in that it assumes phenomena cannot be perceived objectively (Schäfer & O'Neill, 2017: 3). This characteristic fits neatly with the study of critical geopolitics, which, as discussed in previous sections, assumes that knowledge cannot be neutral (Dalby, 1998).

Framing theory can be generic or issue-specific. Semetko and Valkenberg (2000) have notably developed five generic frames: human interest, conflict, morality, accountability and economic effects. Issue-specific frames, on the other hand, fit focused issues such as climate change. These frames may include specific aspects of the issue such as a 'scientific uncertainty' frame or 'environmental determinism.'

Framing theory can be deductive or inductive. Researchers making use of deductive framing methods define frames beforehand and make use of content analysis to discover these frames in the given material (Metag, 2016: 12). Inductive approaches, on the other hand, derive frames directly from the material, making use of syntactic and linguistic aspects (such as the choice of words or coherence of parts of text) (Metag, 2016: 12).

This study seeks to determine how climate change was constructed in South African online news media by determining how often and in what manner selected frames were used in the media's construction of the issue. This study is therefore issue-specific and deductive as it defines climate change frames beforehand, drawing specifically from O'Neill, Williams, Kurz, Wiersma and Boykoff's frame schema as defined in their study *Dominant frames in legacy and social media coverage of the IPCC Fifth Assessment Report* (O'Neill *et al.*, 2015). This schema will be discussed in further detail in section 1.7.1.

1.6 Research Design and Methodology

This study will make use of qualitative content analysis. Qualitative research is appropriate for the study of critical geopolitics and the framing of the environment as it involves 'thick' descriptions of text, thus enabling the researcher to show how various interpretations of an issue are possible (Tracey, 2013: 5). A qualitative content analysis similarly allows the researcher to conduct a 'closer reading' of material and thus elaborate on prevailing themes through interpretive methods (Metag, 2016: 9).

Bless, Higson-Smith and Sithole (2013: 17) define qualitative research by its prominent attributes. These include inductive reasoning, a small sample size that is not representative of the population and an analysis that determines the recurrence of a theme. They suggest that "qualitative methods emerged out of more recent philosophical beliefs that truth is relative and

that knowledge is constructed by human beings" (Bless, Higson-Smith & Sithole, 2013: 15). A qualitative approach is thus beneficial as it provides insight that may be overlooked in structured quantitative approaches and experiments (Tracey, 2013: 5).

Babbie defines content analysis as "the study of recorded human communications, such as books, websites, paintings and laws" (2013: 295). Content analysis is particularly relevant to the study of critical geopolitics as it seeks to bring to light underlying meanings in communication through questions such as: "Who says what, to whom, why, how, and to what effect?" (Babbie, 2013: 296). Content analysis is often driven by theories such as literary theories, critical discourse and framing. This study made use of framing theory and an issue-specific framing schema in determining the 'framing of climate change' in South African media. This will be discussed in section 1.8.1.

Content analysis has the advantage of saving both time and money as there is no requirement for a large research staff or special equipment, just the material that must be coded (Babbie, 2013: 306–307). Although this method of analysis is restricted as it is limited to the examination of recorded communications, it does not compromise this study (Babbie, 2013: 307).

Data for this study will be gathered from the top South African news media websites. News media websites were chosen according to the *Reuters Institute Digital News Report*, which ranks the top online news media 'brands' in South Africa according to % weekly usage. This study will not include data from international news media websites such as BBC and CNN, or regional/local newspaper websites as the focus of this study is on South African (national) media websites.[6] The websites that will be used in this study were ranked as the top three news sites in South Africa as of January 2020: News24, SABC News Online and eNCA.

It should be noted that the news brands News24 and Daily Sun form part of the print media company, Media24. Media24 owns various media brands including newspapers, magazines and digital media websites (Media24 - Digital, 2020). The company's digital media division in particular works to create an "African network of popular digital publishing brands and online services" (Media24 - Digital, 2020)." To create this network, Media24 uses news websites such

[6] Several South African news websites host international organisations/news groups as contributors. These include Reuters, World Economic Forum and AFP. Although these contributors are international, they will still be considered in this study as they appear on South African news websites in addition to making up the bulk of mediated content.

as News24 to share articles from their other 'digital brands'[7] and 'newspaper brands'.[8] These articles will not be included in this study as they are considered distinct brands by both Media24 and the *Reuters Institute Digital News Report.*

Online news articles will be gathered by making use of the search function on news media websites. The keywords 'climate change,' 'global warming,' 'Anthropocene' and 'environmental breakdown' will be used to search the top 3 most used sites in South Africa. These keywords have been chosen to identify articles that deal with aspects of climate change. A variety of terms referring to the phenomenon of climate change will be used to ensure that this search is rigorous. Articles that are false positives, in that they do not discuss climate change, will be removed from the sample.

Furthermore, because the chosen websites are online news platforms and thus host popular contributors such as Reuters, World Economic Forum, Aljazeera and AFP, the same article may appear on more than one website chosen for this study. These articles will be removed from the data sample as they are not unique to one website.

The sample size of news websites will be limited to the top South African English news websites. The study is restricted to English news websites as a content analysis requires a deep reading of the media and the researcher is proficient in English only. Three websites will be analysed to confine the study to a reasonable sample size.

The news media sites will be accessed and searched for articles containing the abovementioned keywords. All articles that deal with the issue of climate change (disregarding those that come back as false positives or are duplicates) during December 2019 will be selected and saved for coding, thus making up the *n* for each news website.

The selection of this study period was decided upon as the 2019 United Nations Climate Change Conference (COP25) was held from 2- 13 December 2019. This annual meeting brings together Parties to the Kyoto Protocol and the Paris Agreement and is tasked with assessing progress in dealing with climate change. News articles written during the month of December 2019 are thus assumed to consider the most recent issues on climate change and are the most relevant for this study.

[7] Media24's digital brands include: Business Insider, Careers24, Channel24, Fin24, Health24, Netnuus, Netwerk24, News24 and more

[8] Media24's newspaper brands include: *Beeld, City Press, Daily Sun, Die Burger, Rapport* and more.

Purposive sampling will be used when retrieving articles from news media sites. Purposive sampling or judgemental sampling is appropriate for this study as it involves selecting a sample based on the researcher's knowledge of the purpose of the study (Babbie, 2013: 128).

	Website	Number of Articles (n)
1.	News24: https://www.news24.com/[9]	26
2.	SABC News online: https://www.sabcnews.com/sabcnews/	21
3.	ENCA: https://www.enca.com/	12

Table 1: Number of climate change-related articles per website (table compiled by the author for this study)

1.7 Method of Data Analysis

Content analysis uses the process of coding to classify communications (oral, written or other) according to conceptual frameworks (Babbie, 2013: 300). Babbie describes coding as "the process of transforming raw data into a standardised form" (Babbie, 2013: 300). Codes in qualitative research are thus "a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data" (Saldaña, 2013: 3). This study will make use of the framing schema as outlined in Table 2 to classify data gathered.

Qualitative coding makes use of a variety of tools. Coding can be executed with manual tools (paper, coloured pencils), computer-aided approaches with everyday software (Microsoft Excel, Word) or specific data-analysis software (ATLAS.ti) (Tracey, 2013). This study will make use of everyday software such as Microsoft Excel and Word.

Coding can be manifest or latent content. Manifest coding of content is objective and refers to the visible surface content of the research (Babbie, 2013: 301). The strengths of manifest coding lie in its ease and reliability in coding (Babbie, 2013: 301). Latent coding, on the other hand, entails a subjective assessment of the underlying meaning of data (Babbie, 2013: 301). Although latent coding is the preferred method when the researcher is seeking to uncover the underlying meaning of data, it comes at the cost of reliability and specificity. Thus, this study

[9] News24 has several 'vertical brands' such as Business Insider, City Press

will make use of manifest and latent coding in primary and secondary cycles of coding respectively.

This study will implement two cycles of coding (Tracey, 2013). The process of coding will begin with data immersion, when the raw data are reflected upon. Thereafter, primary-cycle coding starts, making use of manifest, descriptive coding. Finally, the researcher will assign underlying meaning to codes assigned in the primary-cycle of coding through a second-cycle of coding, making use of latent coding.

The data immersion phase begins when the researcher asks open-ended questions such as "What is happening here?" or "What strikes you?" (Creswell, Hanson, Clark Plano & Morales, 2007: 153). In answering these questions, the act of coding begins.

Texts will be added to the Microsoft Word programme to begin computer-aided coding. In the primary-cycle of coding the researcher will examine the data, identifying words and phrases that capture their essence and making use of descriptive codes to create 1st-level codes (Tracey, 2013: 189). This will be done through the 'comment' function in Word. These 1st-level codes will be manifest codes and thus identify descriptive, basic activities and processes in the data (Tracey, 2013: 189). To avoid definitional drift, the constant comparative method will be used, thus ensuring that the analysis is circular, iterative and reflexive (Tracey, 2013: 190; Gibbs, 2007). 1st-level coding in this study will be descriptive, thus focusing on language, metaphors and phrases found in the article itself.

Language, metaphors and phrases found in article	**Descriptive Code (1st-Level Codes)**
"sacrificed the planet," "the existential threat of climate change," "earth-shattering … uninhabitable planet"	Apocalyptic
"irreversible tipping point," "danger warming could pass a point of no return,"	Overshoot
"carbon trading," "carbon credits," "sun tax"	Market-based Mechanisms

Table 2: Examples of Descriptive Codes (table compiled by the author for this study)

In the secondary cycle of coding the researcher will interpret the 1st-level (primary cycle coding) codes and organise them into interpretive concepts to determine the presence of the *economic* or *disaster* frame (Tracey, 2013: 194). The secondary cycle of coding thus works 1st-level codes into 'focused' categories (Saldaña, 2013). First, to make conceptual sense of these

1st-level codes, they will be 'focused' or grouped under various 'umbrella' categories (i.e. 'frightening language' and 'economy') (Tracey, 2013: 195). This is illustrated in Table 3 (below).

Descriptive Codes (1st-level codes)	**Focused Categories (2nd-level codes)**
Emergency, Apocalyptic	Frightening Language
Numerous Impacts, Bleak scientific findings, Vulnerable	Listing Impacts
Monetary cost, Overshoot, Risk multiplier	Scale of Challenges
Conditional support, Possible, Opportunity, Calls for, Urgency	Support
Priorities, Lucrative Fossil Fuel, Reluctance, Scepticism	Critical
Low Carbon Economy, Market-based Mechanisms	Divestment
Employment, Economic prosperity, Monetary cost, Assets	Economy

Table 3: Categorised Descriptive Codes (Author's own simplification and interpretation of O'Neill et al. (2015) and supplemented by Dryzek (2013))

Next, the researcher will work to understand these 'focused' categories in terms of the themes and storylines that constitute the *disaster* and *economic* frame by analysing the grouping of these 'focused' codes into 'frame indicators' (see Table 4). For example, the presence of descriptive codes that are categorised as 'frightening language' and those that are categorised as 'listing impacts' would indicate the presence of the *disaster* frame. The researcher will conclude secondary-cycle coding once theoretical saturation is reached (when no new or relevant data emerge for a specific category).

Frame Indicators - Focused Categories (2nd-level codes)	**Frame**
frightening language + listing impacts frightening language + scale of challenge	<u>Disaster</u> *Predicted impacts are dire. Impacts are numerous, discussed in detail. Impacts will get worse and we are not prepared* • Unprecedented rise in average surface temperature • Lists and details of severe impacts: sea level rise, snow and ice decline, decline in coral reefs; extreme weather (droughts, heatwaves, floods), migration and food security • Scale of the challenge (ecologically, socially, temporarily, financially) almost overwhelming
<u>Economic (1)</u> Divestment + Support Economy + Support Economy + Divestment + Support <u>Economic (2)</u> Divestment + Critical Economy + Critical Divestment + Economy + Critical	<u>Economic</u> *Discusses growth, prosperity, investments, markets. Indicates economic costs.* Economic (1): • Taking action now (details possible economic actions such as divestment) • Cost of mitigating climate change is high, but will be higher if we don't act now. Divestment from fossil fuels Economic (2) • Action is hugely expensive (or too costly in context of other priorities). Likely to mention uncertainty • UN is proposing climate plans which will damage economic growth (issues with Annex II countries)

Table 4: Frames and Code Categories (adapted from O'Neill et al. (2015), compiled by the author of this study)

1.7.1 Coding Schema for Frames

Tables 3 and 4 are largely adapted from O'Neill *et al.* (2015) with some supplementation from Dryzek (2013). This coding schema was chosen as it was developed through a qualitative literature review of previous research on media communication about climate change, thus creating an amalgamation of frame schema in the field. This framing schema draws from Entman's (1991) definition of issue framing and is designed to be used for inductive frame analysis, making it suitable for this study. O'Neill *et al.* note that although this frame schema was developed to analyse the IPCC reportage, it is applicable across climate change media studies.

The original framing schema of O'Neill *et al.* consists of ten climate change-specific frames. To keep this study a manageable size, only two of these frames have been selected for coding. The *economic* and *disaster* frames were chosen as they embody the building blocks of several

environmental discourses such as the 'problem solving,' 'survivalist' and 'sustainability' discourses outlined by Dryzek (discussed in section 2.3.2), thus situating them within the broader literature (Dryzek, 2013; O'Neill *et al.*, 2015).

The *economic* frame exemplifies aspects of economic rationalism (one of the problem-solving discourses) as it constructs the climate change issue in relation to economic growth, prosperity, investments and markets. The *disaster* frame embodies aspects of the survivalism discourse including the use of alarmist language and, drawing attention to the overwhelming scale of climate change. A more detailed discussion of the chosen frames will be presented in Chapter 4.

1.8 Limitations of the Study

As a result of the qualitative nature of this study, it should be noted that generalisations about its conclusions are not possible. By their nature, qualitative studies focus on in-depth knowledge (Peters, Pierre, Stoker, Burnham, Lutz, Grant & Layton-Henry, 2008: 40).

Qualitative content analysis makes use of the researcher's background knowledge and subjective judgement of relevant data. To ground this study's methodology in a more replicable and objective foundation, the researcher made use of both manifest and latent coding. Thus, while the primary cycle of coding was manifest and drew from the researcher's subjective judgement of the data, the second cycle of coding made use of a replicable 'formula' to arrive at the frames.

Secondly, it should be noted that in this study the understanding of 'climate change' is taken as scientific reality. This study therefore does not seek to critique the scientific validity of climate change and its repercussions. Furthermore, this understanding of climate change is limited to that of scientific findings as of October 2020.

Limited resources do not allow for this study to encompass *all* online news media in South Africa. Conclusions drawn on the basis of the media frames used by South African media are limited to the sample size. Furthermore, there are many climate change-related frames that may be coded for. As a result of time and space constraints, the researcher had resources available to code for only two frames.

Finally, this study does not seek to draw conclusions about how media content on climate change influences people's views on climate change. The aim of this study is only to understand

the media frames of climate change in the top 3 South African English online news sites and further analyse these in light of geopolitical understandings of the environment.

1.9 Outline of Study

This study is comprised of five chapters, building on from one another.

Chapter 2 provides an overview of the literature on geopolitics, popular geopolitics and geopolitics and the environment to situate the study in these broader fields of research. It thus focuses on the theoretical underpinnings of this study.

Chapter 3 further the study within the current-day setting of climate change. This chapter will provide a contextualisation of climate change with specific reference to the various levels of the repercussions of climate change and the attempts at mitigation and adaptation. Additionally, this chapter zooms in on climate change within the African and South African contexts.

Chapter 4 will begin by outlining the framing process in detail, describing the selected frames and laying out the primary and secondary cycles of coding. After that, 1st-level and 2nd -level codes will be conceptualised and examples of the coding process will be detailed, making use of six exemplary articles. This chapter will critically analyse the results of the coding process, paying specific attention to how often the selected codes appeared and in what context they appeared in.

Chapter 5 concludes the study by reflecting on its relevance, evolution and findings. In doing so, the researcher explicitly addresses the research question and makes recommendations for future research.

2 Literature Review and Theoretical Foundation

2.1 Introduction

This study argues that understanding the representation of issues such as climate change is imperative to understanding them more objectively and thus responding adequately. It therefore draws from the theoretical foundation of geopolitics with specific reference to a critical understanding of geopolitics by popular geopolitical actors in terms of environmental geopolitics. In the first sections, the establishment of classical geopolitics is traced back to its historical context. After that, contemporary approaches such as critical and feminist geopolitics are discussed. Drawing on the tradition of critical geopolitics, section two discusses various environmental discourses and their implicit assumptions. Finally, in seeking to understand the online news media component of this study within the field of geopolitics, section three discusses selected items from the literature on popular geopolitics. This section pays specific attention to important concepts within popular geopolitics and the importance of popular geopolitics for the broader tradition of geopolitics and International Relations.

Chapter 2 thus locates this study within these broader fields, grounding it in the theory of geopolitics. Overall, this is vital for the study as it unpacks why it is necessary to understand how issues such as climate change are represented by influential sources such as online news media.

2.2 Geopolitics

Although the term 'geopolitics' is often used to generally describe the interface of international relations and geographies such as international border disputes or geographical patterns of election results, it is, in fact a distinct academic field of study (Agnew, 2003: 5). Agnew describes the academic study of geopolitics as "the study of geographical representations, rhetoric and practices that underpin world politics". Flint (2017), however, places more emphasis on geopolitics as a specific geographical or spatial perspective and the actors involved. Dodds (2007), on the other hand, argues that working towards a consensus over a single definition of geopolitics is not productive. Instead, he argues that it is more useful to understand the two distinct approaches to geopolitics outlined below.

The study of geopolitics is broadly divided into two approaches: the classical approach and the contemporary approach. The classical approach outlines a more realist stance on International Relations and is detailed by the 'forefathers' of geopolitics such as Rudolf Kjellen, Friedrich Ratzel and Sir Halford Mackinder. The second, more contemporary approach encompasses

critical geopolitics and feminist geopolitics. Scholars of this approach include Dodds, Agnew and Flint.

The first and more classical understanding of geopolitics provides a 'guide' to the global landscape by using geographical metaphors, descriptions and templates (Dodds, 2007: 4). In this way, geopolitics is understood as a tool to organise and explain global relations and events on a geographical scale. This understanding of geopolitics is often used in security, foreign policy and general 'news' related areas as it conveys a 'simple' model of the world (Dodds, 2007: 4).

The second understanding of geopolitics focuses more on how geopolitics *works*. This understanding takes a more contemporary turn, encompassing critical and feminist geopolitics. Contemporary geopolitics thus examines the way in which geopolitical labels or simplifications generate understandings and perceptions of global events and communities, and the accompanying identities are examined (Dodds, 2007: 4). Agnew's understanding of geopolitics as "representations, rhetoric and practices that underpin world politics" thus falls under this second understanding of geopolitics (Agnew, 2003).

2.2.1 Classical Geopolitics

The geopolitical tradition of understanding politics in the light of geographical features or nature had been practised long before the coining of the term by Rudolf Kjellen in 1899. Geopolitical reflection can be traced back as far as Aristotle and Bodin (Kristof, 1960). While Aristotle wrote on how nature might affect the military necessities of a state, Bodin studied the variations in human nature that occur on the basis of environmental differences (Kristof, 1960: 17–18). The workings of both Aristotle and Bodin are indicative of the premise of geopolitics – the striving towards an objective science underpinning human activity, cooperation and conflict (Kristof, 1960: 18). The establishment of geopolitics as a distinct subject was thus spurred on by this search for an 'objective science' of politics and moulded by the historical climate of the 19th century.

2.2.1.1 The Establishment of Geopolitics

The formal establishment of geopolitics as a distinct field of study is a product of its historical context. In the light of the political and economic climate of the 19th century, notable scholars such as Rudolf Kjellén, Friedrich Ratzel and Sir Halford Mackinder rose to prominence, garnering widespread support for their work in unveiling the 'objective science' of politics.

Dodds (2007: 25) situates the establishment of geopolitics as a distinct subject within the context of the anxieties around economic nationalism and colonial expansion at the time. He argues that the establishment of the subject was spurred on by the fears of, mostly, France and Britain, about the state of their economies in the light of trade protectionism and the rise of the United States (USA) as a trading power (Dodds, 2007: 26). These anxieties, he argues, coincided with the establishment of geography as a distinct subject and the growth of universities, giving scholars the rationale for expanding the subject (Dodds, 2007: 26).

In the light of this context, various scholars began developing and expanding theories on the connection between politics and the environment. The initial establishment and development of geopolitics into a distinct subject is attributed to three prominent scholars: Sir Halford Makinder, Rudolf Kjellen and Friedrich Ratzl.

These scholars sought to create a scientific and objective understanding of why states flourished, struggled, cooperated and waged war on one another. Following the process of scientific research, they sought to 'apply' the science of geopolitics, exploring the reality of a given landscape, before drawing conclusions about its political state (Cahnman, 1943: 56). The conceptualisation of geopolitics of all three of these scholars (as discussed below) was thus similar and they followed the classical, realist understanding of the field.

The work of Sir Halford Mackinder played an important role in shaping Britain's understanding of its place in international relations. Importantly, Mackinder's work also influenced the writings of Ratzel and Kjellen. Although, the term 'geopolitics' had yet to be coined, Mackinder's seminal paper "Democratic Ideals and Reality" contributed greatly to the establishment of geopolitics as a distinct subject. Central to this paper was Mackinder's emphasis on the "paramount importance of geography to the study of history and global politics" (Sempa, 2002: 14). In short, he argued that the unequal growth of nations was mostly due to uneven distribution of fertility and strategical opportunity (Sempa, 2002: 14). Thus, for Mackinder, it was the particular grouping of lands, seas and fertility (for agriculture) that led to the growth of empires (Sempa, 2002: 14).

Friedrich Ratzel is credited with writing the first treatise on geopolitics. Influenced heavily by the natural sciences and Social Darwinism, Ratzel sought to conceptualize the state in terms of a 'superorganism' that was moulded by its physical environment (Dodds, 2007: 28) . Ratzel maintained that in the past the social sciences had conceptualized relations between states (or relations between 'superorganisms') as grounded 'in the air' as opposed to being developed on

a scientific and geographical foundation (Cahnman, 1943: 55). According to Ratzel, the interface of politics and geography motivated the struggle of states and their creators to secure the 'fittest' states and people (Dodds, 2007: 28). Hence, for the superorganism to thrive, it needed both the 'fittest' people and, more importantly, the best resources and territory (Dodds, 2007: 28).

In 1899 Swedish professor Rudolf Kjellen first coined the term 'geopolitics' as he posited that thinking on a global or international scale was intrinsically connected to geographical reasoning (Agnew, Mitchell & Toal, 2003: 5). Similar to Ratzel, Kjellen attempted to create a political science that was not grounded in idealism or a legalistic approach, but rather one "with its feet literally on earth" (Cahnman, 1943: 55).

German scholars, in particular, were drawn to the work of Kjellen as a tool for understanding the German state with regards to its territorial and resource needs (Dodds, 2007: 28). Dodds attributes this to both the physical proximity and interchange of scholars between Germany and Scandinavia (Dodds, 2007: 28). This interchange is pertinent to the trajectory that the study and use of the term 'geopolitics' later took.

These 'forefathers' of geopolitics thus believed that the 'material resources' determined by geographical terrain was central to the outcomes of conflict and competition. This is the architype of 'classical' geopolitics. The power of this supposedly objective science of politics was most notably displayed in its justification of the actions in Nazi Germany.

2.2.1.2 Geopolitics and Nazism

It is important to take account of the way that the ideas of geopolitics were used in Nazi Germany. Not only did it bring to light the power of 'rhetoric' and 'framing,' but it also eventually espoused contemporary approaches to geopolitics – especially critical geopolitics.

The ideas of geopolitics were taken up by the Nazi party because of a politically 'ripe moment.' Thus, the dissemination of Friedrich Ratzel's ideas became particularly prominent during a time of German frustration after the end of World War I (WWI). Their understanding of geopolitics worked to bolster the belief that the German defeat after 1919 was an undeserved disaster and that the German state had the potential to expand and become a European hegemon, but that it had been subjected to territorial loss and economic downturn after the Treaty of Versailles (Dodds, 2007: 29).

Geopolitics was widely adopted for its association with and justification of post-war German National Socialism and other forms of fascism. This was largely due to the fact that many of Germany's most prominent geopolitical thinkers, such as Haushofer, had close ties with the Nazi regime (Dodds, 2007: 24). Scholars such as Bowman have thus argued that German geopolitics was developed to suit the Nazi agenda for expansion and aggression (Bowman, 1942: 647).

Still there were important differences between Nazi geopolitics and the geopolitics of academics such as Haushofer. While Haushofer, like many of his fellow geopolitical thinkers, was concerned with spatial relations and the state, Hitler placed far more emphasis on the role of people in the course of relations between states (Dodds, 2007: 33). Nonetheless, because geopolitics was framed as an objective science, Hitler's regime was able to use the geopoliticians' explanation of the state as indicating the need for space (*lebensraum*) and linked this to policies of racial purity and ethnonationalism (Dalby, 1998: 295). Overall, the Nazis were able to justify their actions by framing their rationale as inevitable and objective science.

As the horrors of the Holocaust began to come to light, the mere word 'geopolitics' was viewed with disgust. Gottman (1942), for example, even tried to salvage some of the principles of geopolitics by disassociating them from the word 'geopolitics.' He argues that while *political geography* is a science that examines the relations between political organizations and the geographical environment, German geopolitics was only a guise of scientific political geography (Gottmann, 1942: 197–198).

Classical geopolitics was thus deemed a problematic discipline in the light of the fact that the supposed objectivity of the discipline was readily adopted to shape the political philosophy of Nazi Germany (Massaro & Williams, 2013: 568). Classical geopolitics has since been criticized by contemporary geopolitics scholars such as Flint for being merely an "an endeavor of elite white males in predominantly Western countries with an eye on promoting particular political agenda" (Flint, 2017: 3).

The term 'geopolitics' eventually returned to academic writing. Having learned from the past, the contemporary form of geopolitics paid specific attention to how issues are represented.

2.2.2 Contemporary Geopolitics

Contemporary geopolitics is understood as a 'reclaiming' of geopolitics from elitist statesmen, emphasizing the necessity of challenging the statements of authority (Flint, 2017: 5). Areas of

concern considered in the geopolitical analysis are thus not only states but also factions within states, cyberspace, terrorism, media and more (Flint, 2017: 3). In this way, contemporary geopolitics is more expansive in what it considers 'political' and 'geography,' and does not consider interactions between the two as only state-based (Flint, 2017: 3). Contemporary geopolitics scholars can be further divided into two schools of thought: critical geopolitics and feminist geopolitics (a branch of critical geopolitics).

Overall, the development of critical geopolitics arose in response to classical geopolitics. Critical geopoliticians argue that classical forms of geopolitics are one-dimensional, realist and state-centric. For proponents of critical geopolitics, classical geopolitics does not provide a full picture of geopolitical relations as it champions the state and does not examine possible biases and political agendas that geopolitical actors may have. Thus, while classical geopolitics sought to analyse 'the way the world is', as they understood it, critical geopolitics questioned "how and why we have come to think of the world in a certain way" (Dittmer & Bos, 2019: 11).

Developed from postmodernism, critical geopolitics sought to reclaim the study from its tainted past and its lack of academic engagement since its decline after WWII (Flint, 2017: 25). The postmodernism underpinning of this new lease on geopolitics meant that an attempt was made to deconstruct the statements of authority, with specific emphasis on those dealing with science and government policy (Flint, 2017: 25). In this way, critical geopoliticians seek to unveil biases and political agendas in geopolitical statements and actions by looking at the language used (Flint, 2017: 25). Thus, critical geopolitics seeks to be self-reflective about geopolitical claims, especially when claims are presented as objective truths (Dodds, 2007: 42).

Critical geopolitics seeks to examine three areas of geopolitics. Firstly, the formal domain deals with the work of academics and commentators such as think tanks and strategic institutes (Dodds, 2007: 45). Secondly, the practical or policy-oriented geographical templates are used to represent the global politics created by foreign policy, bureaucracy and political institutions (Dodds, 2007: 45). Finally, popular sources of geopolitics can be found in popular culture such as mass media, cinema, novels and cartoons (Dittmer & Bos, 2019). Dodds notes that the three domains are interconnected (Dodds, 2007: 46).

Within these areas of geopolitics, geopolitics plays out in terms of practice and representation. 'Practice' refers to the actions and decisions made by actors (such as declarations of war) and 'representation' refers to the ways in which these actions are understood or justified by various

geopolitical actors (Flint, 2017: 38). However, as noted by Muller (2008), geopolitical practice and geopolitical representation cannot be separated from one another.

Still, Coleman has criticized this understanding of geopolitics, arguing that critical geopolitics has a parasitic relationship with mainstream geopolitics (Coleman, 2009: 905). This criticism is echoed by Tuathail, who states that "in seeking to engage certain discourses in order to displace them, one invariably is dependent to a certain degree upon the organizing terms of these discourses" (Tuathail, 2005: 49; Tuathail & Routledge, 1998). Although Tuathail (2005) agrees with Coleman (2009) that, in attempting to uncover the underlying motives and premises of geopolitical discourses, critical geopolitics has failed to be self-reflective of its method of analysis, he does not see this as grounds to write off critical geopolitics. Tuathail thus argues that critical geopolitics cannot be understood as a theory, but rather as an "active intervention and commentary on the global political scene" (2005: 53). In other words, critical geopolitics is the recognition that commentary on global politics must be analysed and dissected to reveal which premises have resulted in specific framings.

Criticism of critical geopolitics is also found in the literature on feminist geopolitics. As will be discussed in the next section, this criticism hinges on the disregard in critical geopolitics of the 'everyday,' focusing more exclusively on 'high politics.' Although this study is guided by the principles of critical geopolitics, it also has recourse to some important insights from feminist geopolitics.

Feminist geopolitics takes on board the conceptual foundations of critical geopolitics, even though its point of focus differs. As discussed above, feminist geopoliticians' point of departure is a focus on the 'everyday' and on lived experience. Drawing on the work of Cynthia Enloe, scholars such as Dowler and Sharp (2001), Staehli (2001) and Hyndman (2007) have maintained that the importance of understanding that 'the personal is political' is overlooked by proponents of critical geopolitics. While this section will discuss the conceptual underpinnings of feminist geopolitics, examples of how 'the personal is political' are elaborated on under Section four: Popular Geopolitics.

Much of the literature on the need for a feminist take on geopolitics hinges on the *scope* of critical geopolitics. Staeheli (2001), for instance, has problematized critical geopolitics, arguing that it 'fetishizes' states and statecraft, resulting in local and lived experiences not being regarded as meaningful in geopolitical rhetoric. In line with these sentiments, Dowler and Sharp (2001: 167) note that analyses provided by critical geopolitics emanate from a

'disembodied spectator,' one not defined by gender, race, class, sexuality or physical ability. Commentary in this regard is presented as unbiased and universal, but they argue that in fact the language used in these discussions is often Western forms of reasoning and propounded by white males (Dowler & Sharp, 2001: 167).

Dalby (1994), on the other hand, argues that a gender-sensitive approach will add value and nuance to geopolitical analyses. For Dalby (1994: 595), a stance that takes into account gender assumptions and attention to how the vulnerability of women is contingent on political spatializations will invariably enlarge the scope of critical geopolitical enquiry. Hyndman (2007) argues that this is especially important with regards to narratives around wartime experience, as feminist geopolitics shifts the subject of geopolitics as being conflict between states over oil or weapons, and rather casts the spotlight on the fate of the people caught up in such conflict.

It is clear from the above that the study of feminist geopolitics demands data that can only be extracted through methods that provide in-depth, nuanced information such as personal interviews. While this study does not have the capacity to conduct such research, it sees the importance in taking the personal into account when studying geopolitics.

This study thus, draws on the work of critical and feminist geopolitics. In examining how media construct understandings of environmental issues, this study places an emphasis on the interplay between the 'personal' and the 'political' as is noted by feminist scholars such as Dowler and Sharp (2001), Staehli (2001) and Hyndman (2007). These 'constructions' of environmental issues are informed by several, broad environmental discourses. These will be discussed next.

2.3 Geopolitics and the Environment

The environment has been made a topic of geopolitics as it acts as a structure that frames geopolitical agency (Flint, 2017: 8). Although the study of the environment in relation to geopolitics can be traced back to the establishment of geopolitics itself (see Section 2), the issue of climate change poses a unique challenge for geopolitical actors. The nature of challenge that the environment poses, however, is contingent on how the environment is framed. Thus, while some scholars focus on how climate change, for example, may affect the geopolitical landscape, others pay attention to the different ways in which the challenge of the environment is framed and constructed.

While this study focuses on critically analysing how environmental issues are constructed, it is important to contextualize the state of the geopolitical landscape in the light of new challenges such as climate change.

2.3.1 The Changing Geopolitical Environment

Since the end of the Cold War, geopolitical thinkers have been divided over how this new order or disorder will affect intergovernmental relations. For Smith (2011: 314), this 'new order' will be characterized by a multipolar rather than a unipolar structure of relations, cooperation and conflict. Furthermore, scholars have grappled with the issue of a more interconnected, globalized and 'borderless' world – moving away from the state-centric, classical approach to geopolitics. Scholars focusing on the structure of geopolitical relations in the light of environmental issues such as climate change generally do so in the light of this 'borderless' world. Castree (2003) thus, characterizes the environmental challenges of the 20th century in terms of a tension between territorializing (as environmental issues are grounded in territory and specific geographies) and deterritorialization (environmental issue do not adhere to state borders or state responses).

This ceding of power 'upwards' can be seen in international agreements such as the Paris Agreement, which necessitates Nationally Determined Contributions (NDCs) such as reducing carbon emissions and adapting to climate change impacts (UNFCC). Importance is thus placed on how ecological interdependence has shifted global relations towards negotiation-based, consensual relations and away from militaristic conflict and diplomatic stand-offs (Castree, 2003: 426).

While Castree focuses so on how environmental issues have and may continue to change the structure of interstate relations, Hommel and Murphy (2013: 507) place the emphasis on how the immensity of 21st-century environmental issues (climate change in particular) will fundamentally change the taken-for-granted premises of geopolitics. In bringing to light the underlying premises of many forecasts for the future of geopolitics, Hommel and Murphy (2013) show that extrapolations of current economic, demographic, military, conflict and cooperation trends may not hold true in the event of major environmental disruptions.

Castree (2003), Smith (2011) and Hommel and Murphy (2013) focus on how the structure of geopolitics has and will continue to change as a result of environmental disruptions. This includes changes in the way states work together as well as changes in the basic premises of relations between states. These understandings of geopolitics in terms of environmental change

are informed by several broad environmental discourses and practices propounded by state and non-state actors taking into account escalating challenges.

2.3.2 Geopolitical Environmental Discourse and Practice

Drawing on critical geopolitics (as discussed under Section 2.3.1), a large portion of the literature on geopolitics and the environment examines the various framings of environmental issues and how these affect whose interests are championed and how issues are dealt with. Environmental geopolitics can hence be understood in terms of discourse and practice (Flint, 2017).

There is a general consensus among scholars in this field that the way in which environmental issues are approached is contingent on specific narratives or framings. In line with the notions of critical geopolitics, Castree (2003: 427) and Dalby (1998: 180) agree that when it comes to the geopolitics of environmental issues, knowledge and perspectives cannot be neutral or objective. Castree (2003: 427) backs up this view by drawing attention to the plethora of actors (states, NGOs, quasi-governmental bodies and scientists) and the fact that they each have different and often even conflicting agendas and priorities, and hence perpetuate varying discourses and practices. Dalby (1998: 180) similarly argues that 'knowledge' (or the way an environmental issue is framed) is a political resource used in policy decisions and political arguments.

Leichenko and O'Brien (2008: 13) add to this by noting that the way in which problems are represented also provides the basis for agreements and disagreements on the topic. In this way, certain viewpoints are given more credibility and power over others, making it possible for the safeguarding of a certain group's wellbeing over others (Leichenko & O'Brien, 2008: 13).

Castree (2003: 427) brings another dimension to the understanding of discourse and practice around environmental geopolitics. Taking into account the multipolar world, as described by Smith (2011), it follows that there may be a multitude of contending hegemonic discourses. Furthermore, these representations or 'discursive-practice regimes' may differ across regions and even glean elements from one another, making them recursive (Castree, 2003: 427). Overall, this means that what is represented as the 'truth' is underpinned by a multitude of origins and discursive-practice regimes.

Castree (2003), Dalby (1998) and Leichenko and O'Brien (2008) show that environmental geopolitics is a multi-layered representation of an issue by various actors. In his seminal book,

The Politics of the Earth: Environmental Discourses, Dryzek (2013) shows that environmental discourses can be divided into 'problem-solving' approaches, 'sustainability,' 'survivalism' and 'green radicalism'. An account of these environmental discourses was made in Chapter 1, Section 1.4.2 – below, they will be explored in greater detail.

Dryzek notes that 'problem-solving' and 'sustainability' approaches to environmental issues are *reformist* in that they acknowledge that action is required, but maintain that this action can be sourced from the current structures and organization of industrialized society. 'Survivalism' and 'green radicalism' on the other hand are viewed as *radical* as these discourses present the solution to environmental issues as a requiring a restructuring of industrialized society (Dryzek, 2013: 14). In detailing these broad environmental discourses, Dryzek explains how their assumptions about the relations between humans and nature temper the shape of assumed solutions to environmental issues.

2.3.2.1 Problem Solving

The environmental problem-solving discourse takes the current organization of the state as a given and environmental issues as a unique challenge to solve. These discourses include sub-discourses and theories such as administrative rationalism, democratic pragmatism and economic rationalism. Each of these sub-discourses differs from the other in terms of the actor they believe should deal with environmental issues: bureaucracy, institutions of democracy or markets.

Dryzek (2013: 75) defines administrative rationalism as a discourse that places an emphasis on the role of the expert in dealing with environmental issues. The focus of this discourse lies with the practice of developing policies, institutions and methodologies to manage environmental issues (Dryzek, 2013: 75). In this way, social relationships of hierarchy such as in environmental governance institutions are central to solutions (Dryzek, 2013: 75). The construction of environmental issues as an administrative issue is thus manifest in professional resource-management bureaucracies, pollution-control agencies, regulatory policy instruments, environmental impact assessments, expert advisory commissions and policy analysis tools (Dryzek, 2013).

Democratic pragmatism, on the other hand, is characterized by "interactive problem solving within the basic institutional structure of liberal capitalist democracy" (Dryzek, 2013: 99). In this way democratic pragmatism necessitates learning through experience and a flexible process of problem solving that involves a plurality of voices and perspectives (Dryzek, 2013:

100). This plurality of voices and perspectives is understood to originate from the democratic process through devices such as public consultation, alternative dispute-resolution mechanisms, policy dialogue, lay citizen deliberation, public inquiries and right-to-know legislation (Dryzek, 2013).

Fiorino (2018), however, cautions against blind reliance on the democratic system as is manifest in the democratic pragmatism discourse. In doing so, he discusses the challenges democracy in particular faces in the light of an environmental issue such as climate change. These include structural factors such as rigid constitutional features like veto points, legislative representation and electoral rules, whether a system is unitary or federal, patterns of governance and the degree of consolidation of democracy (Fiorino, 2018: 66). Furthermore, political factors such as issue-framing and the governing philosophy also play a role in understanding the challenge of climate change within a democratic system (Fiorino, 2018).

Finally, economic rationalism makes up a third sub-discourse of the broader problem-solving discourse. Economic rationalism is characterized by "its commitment to the intelligent deployment of market mechanisms to achieve public ends" (Dryzek, 2013: 122). The embodiment of economic rationalism can be seen in the fact that solutions to environmental issues are often situated in market-based mechanisms and emphasize that the least harm must be done to the economy (Pascoe, Brincat & Croucher, 2019: 83). The economic rationalists thus assume that actors (individuals and collective firms) are in competitive relationships (Dryzek, 2013: 135).

These problem-solving discourses adopt an anthropocentric standpoint on environmental issues, constructing the environment as providing inputs for the "socioeconomic machine", (Dryzek, 2013: 135). Although these discourses place varying degrees of emphasis on the importance of scientists, governments and citizenship, they all rely on a liberal, capitalist society for their solutions to environmental issues.

The problem-solving discourses construct environmental issues in terms of what needs to be done *here and now* to resolve the tensions between ecological and economic values (Dryzek, 2013: 145). The sustainability discourse, on the other hand, seeks to combine the need for ecological protection, economic growth, social justice and intergenerational equity, locally and globally, in *perpetuity* (Dryzek, 2013: 145).

2.3.2.2 Sustainability

While the discourses discussed above seek to solve the problem of environmental issues through the established structures of industrialized society, the sustainability discourse argues for a refinement of how social, political and economic structures work within this framework. The sustainability discourse is manifest in the sub-discourses: sustainable development and ecological modernization.

Dryzek (2013: 147) notes that since the publication of the Brundtland Commission Report[10] in 1987, sustainable development has been the dominant global discourse of ecological concern (World Commission on Environment and Development, 1987). Central to the sustainable development discourse is the acknowledgement that the development of less developed countries (LDCs) cannot follow the growth path of industrialized countries as this would over-burden the world's ecosystems (Dryzek, 2013: 155).

Nonetheless, this discourse acknowledges that the need for economic growth is essential to satisfy the legitimate needs of the poor (Dryzek, 2013: 155). Furthermore, it is noted that the alleviation of poverty ultimately works in the favour of the environment as people living in poverty are often "forced to abuse their local environment just to survive" (Dryzek, 2013: 155). Overall, sustainable development hinges on the need for economic growth that is environmentally benign and socially just (Dryzek, 2013: 156).

Because this discourse hinges on the stresses of global ecosystems, it places more emphasis on international agreements, non-governmental organizations (NGOs) and intergovernmental organizations (IGOs) (Dryzek, 2013: 158). This discourse is thus often embodied in organizations such as the United Nations, the World Bank and global environmental groups. Castree (2003: 429), a proponent of this discourse, accordingly argues that dealing with environmental issues through international organizations such as the United Nations and its subsidiaries are the best fit for dealing with issues such as environmental sinks (pollution, global warming, hazardous waste) and environmental resources (overfishing, trade in endangered species) as they are transnational by nature.

Taking on board the concerns of sustainable development, the ecological modernization discourse posits that solutions to environmental issues can be reached through the

[10] The Brundtland Commission (also known as the World Commission on Environment and Development) aimed to "direct nations of the world towards the goal of sustainable development (Kono, 2014)."

modernization of the capitalist system in an environmentally sustainable way. Although ecological modernization is understood as the ecological modernization discourse in this section, the term itself was first identified in the 1980s by Joseph Huber and Martin Jänicke (Huber, 1982; Jänicke, 1985).

Hajer defines ecological modernization as the "the restructuring of capitalist political economy along more environmentally sound lines, but not in a way that requires an altogether different kind of political-economic system" (1995: 25). Scholars such as Buttel (2000) and Ninan (2011) explain that this discourse is underpinned by the continued modernization of capitalism and modern experimental sciences to deal with environmental issues.

Key to ecological modernization is the profit incentives for business (Dryzek, 2013: 170). This includes factors that may increase profits in the long run such as lowering pollution (a problem which, when not solved, creates more expensive problems in the future); creating a less polluted and more aesthetically pleasing environment (which results in healthier, happier and more productive workers) and the sale of green goods (as consumers are increasingly choosing more environmentally friendly options) (Dryzek, 2013: 170–171). Thus, this view furthers the belief that environmental issues are products of production and consumption decisions, and the solutions to environmental problem lies in this.

It is clear that the ecological modernization discourse characterizes environmental issues in terms of the way in which consumption, production, resource depletion and pollution are interrelated (Dryzek, 2013: 173). Actors emphasized in this discourse are thus those that play a role in production and consumption practices such as governments, businesses, reform-oriented environmentalists and scientist (Dryzek, 2013: 173). Ecological modernization is evident in an overall focus on technology and capacity building as legal obligations which promote a 'business as usual' understanding of solutions to environmental issues (Pascoe *et al.*, 2019: 83)

Although these sustainability discourses are still anthropocentric, they both work from the premise that natural systems are not separate from humanity, but the two are mutually reinforcing (Dryzek, 2013: 156). While the sustainable development discourse is premised on addressing the stresses imposed on global ecosystems and considers local and global social and biological issues, the ecological modernization discourse focuses more on environmental issues in terms of the way in which consumption, production, resource depletion and pollution are interrelated (Dryzek, 2013: 173, 156). This understanding that the environment is not

merely a resource for advancing liberal capitalism is what differentiates the sustainability discourses from the problem-solving discourses.

The above two reformist discourses (problem solving and sustainability) represent environmental issues as ones that can be solved through incremental changes as opposed to radical changes (Pascoe *et al.*, 2019: 83). In contrast, radical approaches argue that a greater sense of urgency is necessary to deal with environmental issues. Hence the criticism of these approaches can be found in the construction of radical environmental discourses such as survivalism and green radicalism.

2.3.2.3 Survivalism

The survivalist discourse rests on the assumption that the earth has a maximum population of species that it can support in perpetuity. If this carrying capacity is exceeded, the ecosystem will be degraded and populations will crash. Survivalism therefore maintains that issues emanating from the environment cannot be addressed with 'business-as-usual' reformist measures and incremental changes. Although Dryzek (2013: 40) terms this 'survivalism,' it is more commonly known as the 'limits' discourse. Survivalists thus place more emphasis on the limits of the environment, referring to finite reserves of non-renewable resources (oil, gas, coal, metallic ores and cropland) as opposed to renewable sources.

Dryzek (2013: 42) shows that the survivalist discourse is rich in metaphors. These include notions of collapse and overshoot as a result of one species breeding in excess. The tragedy of the commons is often evoked in this sense. [11]Furthermore, survivalists make use of images such as 'Spaceship Earth,' constructing Earth as a whole system that is finite and fragile (Dryzek, 2013: 42). Overall, survivalists make use of images of apocalyptic doom. Survivalist narratives are perpetuated by scholars such as Homer-Dixon (1996), Kaplan (1993) and Smith (2011) and can be understood as following a neo-Malthusian thesis in that conflict is believed to have derived from population growth that is too high for the local resource base (Obi, 1999: 45).

Homer-Dixon (1996) focuses on how scarcities of critical resources may exacerbate existent stressors and contribute towards aggravating violence. Homer-Dixon (1996) pays particular attention to how this may affect Western militaries, creating humanitarian disasters and demanding large amounts of aid. In this line of thought, Kaplan (2001) paints an apocalyptic

[11] The notion of a 'tragedy of the commons' was first posited by Garret Hardin in 1968 and refers to "the eventual overexploitation or degradation of all resources used in common." (Feeny, Berkes, McCay and Acheson, 1990: 1). Resources 'held in common' include oceans, rivers air and parklands (Feeny *et al.*, 1990: 2).

narrative of impending anarchy as a result of 'unchecked' exploitation of nature and growing populations in the Global South. Homer-Dixon (1996) and Kaplan's (2001) framing of the environment, however, has been criticized by various scholars.

Firstly, Obi (1999) and Dalby (1996) point at the heavy reliance on faulty premises such as the neo-Malthusian thesis and the representation of a 'bifurcated' world that understands the *real* problem as lying with the Global South. Obi (1999: 45) critiques the fact that such narratives 'fetishize' the 'demographic trap.' Dalby (1996: 202) points out that this premise of a 'bifurcated' world perpetuates an unsubstantiated, rich vs poor narrative. Additionally, Furedi (1997) notes that these views work to reinvent Malthusian paranoia.

Smil (1994: 212) problematizes the way in which the environment is considered within a "catastrophic paradigm." He argues that the terrifying scenarios that alarmists posit as the future of humankind are unbalanced. Pointing to concerns around the 1900s, he shows that issues such as a shortage of farmland were adjusted for and addressed (Smil, 1994: 212). Although this statement might not hold for current-day climate science projections, Smil's (1994: 213) point that political scientists should be wary of making sweeping statements about environment-related issues that are not sufficiently backed with by enough scientific evidence is arguably still relevant.

In the light of the growing concern about climate change, the survivalist discourse has adopted 'securitized' language, thus framing environmental issues as security issues. Scholars such Redclift (1989), Saurin (1996), Smil (1994), Chaturvedi and Doyle (2010a), Flint (2017) and Dalby (1998) are strongly critical of this discourse. Overall, they warn that framing the environment as a security issue places the spotlight on the symptoms of environmental issues rather than the source.

Obi (1999), along with Redclift (1989) and Saurin (1996), on the other hand, argue that the representation of environmental issues as an 'external threat' in securitization discourses is essentially "environmental determinism" (Obi, 1999: 46). These scholars maintain that to represent environmental crises as natural or inevitable glosses over the socially constructed nature of environmental geopolitics and the relationships between physical spaces, natural resources and patterns of economic forces (Redclift, 1989: 79; Saurin, 1996).

Similarly, Chaturvedi and Doyle (2010b: 110) note that the way in which climate change in particular has been communicated as a 'war on climate' results in encourages, border-centric thinking and actions. Furthermore, once an issue (in this case, the environment) is securitized,

it is viewed in terms of a 'threat' or 'risk' – this language, in turn, gives military, intelligence and security forces a vested interest in the issue at hand (Flint, 2017: 247). Flint (2017: 253) even argues that military-type involvement in environmental issues, at least in the global West, emerged only as a result of states searching for Military Operations Other Than War (MOOTWA) after the end of the Cold War.

Finally, Dalby (2014) shows that the securitization of environmental issues such as climate change lacks innovation and foresight. He thus states that states have "spectacularly failed to deal with climate change and many other global innovations", arguing that a state-centric solution illustrates "a failure of political imagination in the face of novel circumstances" (Dalby, 2014: 9). In other words, Dalby's (2014: 9) point hinges on the idea that focusing on sovereignty, and territorial and military control, is a short-term and inappropriate solution to an issue such as climate change.

As noted above, central to the survivalist discourse are notions of fear and doom. The green radicalism approach, on the other hand, emphasizes a shift in the way in which humans relate to nature. For proponents of the green radicalism discourse, this is pivotal to handling environmental issues.

2.3.2.4 Green Radicalism

Green radicalism discourse is comprised of two sub-narratives: green consciousness and green politics. These discourses are radical in that they reject the basic structure of industrialized society and call for an entirely different construction of the environment-society interaction. Discourses informed by green consciousness and green politics include fields of study such as social ecology, deep ecology, bioregionalism, ecofeminist and environmental justice (Dryzek, 2013).

Green consciousness emphasizes the need for a shift in mindset in understanding and tackling environmental issues. This discourse is grounded in the belief that industrial society creates a warped perception of humanity's place in the world. Dryzek notes that this discourse emphasizes the need to work towards a "new kinds of human sensibilities, less destructive to nature" (2013: 197). The basic building blocks of this construction of environmental problems is thus both inner nature (mind, body and spirit) and outer nature (Dryzek, 2013: 197). These notions are echoed by scholars such as Leach (2007) and Mies and Shiva (1993).

Green politics, on the other hand, places the emphasis on the political dimension, taking on board multiple schools of thought that vary in their degree of radicalism. While the green consciousness discourse focuses on the shift in mindset of individuals, green politics argues that, owing to the multifaceted nature of environmental issues (in that they are both social and ecological issues), solutions lie in political action and structural change (Dryzek, 2013: 219).

Overall, green radicalism focuses on bringing about political change through the transformation of people and society. Thus, it is it is up to humans to change their ways. These sentiments are often underpinned by a sense of urgency in the light of the ecological limits (Dryzek, 2013: 219).

The literature on the environment and geopolitics makes it evident that when viewed through a critical lens, a range of environmental discourses can emerge. As can be gleaned from the above discussion, the way in which environmental issues are constructed plays a major role in how solutions are approached. The problem-solving discourse showed that, when the environment is understood as a resource to fuel liberal capitalism, solutions to environmental issues work within these constructed limits. Thus, solutions to environmental issues are limited to those that work within the bounds of liberal capitalism. The sustainability discourse, on the other hand showed how, when the environment is understood in terms of the way it interacts with human systems and thus industrialized society, solutions do not have to be limited to the traditional confines of markets, democracy and administration. The sustainability discourse made evident that because the environment interacts with human systems, a change in these systems is necessary to reach solutions. Accordingly, the way in which the environment is constructed by the survivalist discourse dictates the solutions deemed appropriate. Because the environment is represented through metaphors of apocalyptic doom and danger, solutions are correspondingly extreme. The green radicalism discourse, on the other hand, represents the existence of environmental issues as a result of humanity's warped perception of its place in the world. In this construction, humanity itself is deemed to be the issue at hand and hence to basis of the solution.

In line with the literature on critical geopolitics, the above discourses may be continued through the 'formal' (academics, think tanks and strategic institutes), 'practical' (policymakers, bureaucracy and political institutions) or 'popular' (popular culture, mass media, cinema, novels and cartoons) dimensions (Dittmer & Bos, 2019; Dodds, 2007: 45). The area of focus for this study is specifically news media and thus the 'popular' arena. The next section

accordingly explores the literature on 'popular geopolitics.' It aims to lay out the basic conceptual foundations of the field in addition to highlighting why scholars of geopolitics view popular geopolitics as integral to their study.

2.4 Popular Geopolitics

Popular geopolitics refers to the geopolitical discourse in which citizens are immersed on a day-to-day basis (Dittmer & Bos, 2019: 15). Developed as an offshoot of 'critical geopolitics', popular geopolitics thus takes into account 'statements' or 'frames' used in popular culture and how these work to construct understandings of spatialized global relations. Drawing on the root meaning of 'medium', information is *mediated* to the everyday person through popular sources (Dittmer & Bos, 2019: 16). The focus of popular geopolitics is thus the media. This includes newspapers, TV journalism, magazines, comic books, television shows, novels, movies, music, and the internet (Dittmer & Bos, 2019: 16).

Overall, popular geopolitics shows how the media influence popular consent and is thus an integral part of a democratic society (Dittmer & Bos, 2019: 15). Saunders and Strukov (2018: 3) conceptualize the concern of popular geopolitics as examining and revealing how popular culture articulates political meaning and geopolitical spaces. Saunders and Strukov (2018) emphasize that popular geopolitics is necessarily interdisciplinary and thus concerns the field of popular culture and its relations to political meaning and global politics.

2.4.1 Basic Concepts in Popular Geopolitics

Certain concepts, although situated outside of 'geopolitics', have been influential in the study of popular geopolitics. These include geopolitical imaginations or imagined communities, and intertextuality.

According to Benedict Anderson, communities are 'imagined' because they are not based on face-to-face contact but rather are brought together symbolically through the use of common media and literature (Anderson, 1991: 6–7). For Anderson (1991) these imagined communities were created through the invention of the printing press, which resulted in the standardization of regional dialects (creating common cultural characteristics such as a regional or national language); the undermining of the authority of elites, access to religiously and politically sensitive texts by the masses, and the creation of an avenue through which readers could gain common understandings of the events of their community.

Dittmer and Bos (2019: 40), however, argue that Anderson's (1991) understanding that a common language was a binding force carries with it associations of racialism in that, this logic would mean that communities that speak a different language would innately think different things and thus be fundamentally different. Although this initial understanding of an 'imagined community' may have problematic underpinnings, it paves the way to understanding 'nations' not as pre-existing entities, but rather as identities contingent on media constructions.

The 'imagined community' serves as a reference point for other 'geopolitical imaginations.' In its simplest form, the geopolitical imagination is thus the construction of geographical and political realities through the media.

The term 'imagined geographies' was initially posited by Edward Said in his seminal book *Orientalism.* The term 'orientalism' for Said signalled British and French 'imagined geographies' of the Arab world. The term 'orientalism' has since been used to refer to any imagined geography of 'the East' that stereotypes the people of that region (Dittmer & Bos, 2019: 40).

Saunders (2012) notes that, although these imagined geographies often exist alongside 'real spaces,' they do not have to. Saunders explains that for some, the geography of Middle Earth from J.R.R. Tolkein's books are just as clear as, for example, the geographies of Central Africa.

Drawing from the above from this, imagined geographies are thus "collections of facts and stereotypes about places in the world that together compose an individual's or group's worldview" (Dittmer & Bos, 2019: 40). Geopolitical imaginations therefore consists of a person's or society's taken-for-granted truths about the world and how power should be used within this imagined geography (Dittmer & Bos, 2019: 41). Saunders (2012) notes that once this 'geopolitical gestalt' is established, it is very hard to change it.

'Intertextuality' is also an important concept in the study of popular geopolitics. The term was first posited by Kristeva (1980) and entails the general understanding that texts do not exist independently, but are influenced and situated contextually and historically by other texts. Dittmar and Bos (2019: 43) thus conceptualize intertextuality as "how text influences other text," where authors borrow ideas and texts to create 'literature.' They argue that geopolitics and popular culture are understood to be enmeshed through this form of intertextuality.

As will be discussed in the following sections, scholars of popular geopolitics maintain that the interplay of popular culture and global relations demonstrates intertextuality. There is thus an

interplay between ‘texts’ in these areas. Constructed ‘imaginations’ and ‘intertextuality’ are concepts often used when examining an issue within the field of popular culture.

2.4.2 Popular Culture

The study of popular culture is a relatively new field, dating back only to the 1960s (Dittmer & Bos, 2019: 21). Although the study of ‘high culture’ such as painting, sculpture and classical music has long been situated in academia, ‘popular culture’ is often understood in opposition to ‘high culture.’ This being said, even though popular culture is often regarded as degrading and of less substance, popular culture and high culture are not entirely distinct, with producers of each type of culture drawing from one another (Dittmer & Bos, 2019: 23).

Saunders and Strukov (2018: 2) argue that, like a language, the importance of popular culture lies in its powers of communication. Through the media, popular culture conveys not only information, but also “structures thinking, brings people together and forces them apart” (Saunders & Strukov, 2018: 2). Saunders and Strukov (2018: 2) thus understand popular culture as an iteration that is formed through images, practices, arrangements and responses. These iterations can be found through a range of channels such as news media, film, novels and art. This study focuses on the iterations of popular culture in online news media.

As noted in the introductory paragraphs of this section, the iterations, discourses, or frames made use of in popular culture construct geopolitical imaginations, thus interacting and intersecting with international relations. The different ways that popular culture is geopolitical in nature will be discussed next.

2.4.3 Popular Culture, International Relations and Geopolitics

Scholars examining the interaction between popular culture and global relations argue that it is undeniable that popular culture feeds off geopolitical events and vice versa (Dittmer & Bos, 2019: 1; Sharp, 1998). Sharp (1998) even notes that “In many cases, the media have provided more imaginative reconceptualizations of international relations, and demonstrate a greater willingness to cast off the older ways of understanding global politics, than formal theorists in international relations” (Sharp, 1998: 153). It is thus through the use of geopolitical imaginations that popular culture affects international relations.

The extent of the interaction between popular culture and global relations are conceptualized by scholars such as Sharp (1998), Wang (2013), Brofen (2006), Nexon and Neumann (2006), Weldes (1999) and Grayson, Davies and Philpott (2009). While some scholars explain this

interaction through ‘levels’ and ‘continuums’, others focus more on how this interaction can be understood as a ‘constructed’ reality through geopolitical imaginations and fantasies.

Sharp (1998: 153) argues that, although the role of the media in shaping domestic political debate has been long documented, less attention has been given to its power in shaping high politics. Nonetheless, she maintains that examples of this fact can easily be found in direct and indirect cases. For example, media in the form of CNN, played a direct role in shaping perceptions of the Gulf War and information for soldiers during the war (Sharp, 1998: 154). Scholars of geopolitics and International Relations, however, tend to focus more on how popular culture indirectly plays a role in affecting high politics.

Sharp (1998: 154) notes that popular culture indirectly plays a pivotal role in constructing hegemonic cultural values that furthermore mould the way politicians act and what societies expect. In line with this, Wang suggests that popular culture builds popular consensus, transmitting norms, delineating boundaries and constructing perceptions of global relations (Wang, 2013: 23). Brofen argues that popular culture creates the “cultural imaginary” (akin to geopolitical imagination) which produces a landscape wherein political battles are fought and “it is here that coherent narratives are produced, which in turn serve as the basis for any sense of community and political action” (2006: 21–23). Thus, state policy or action is made to seem commonsensical through popular culture (Weldes, 1999: 119). A recent example of this includes the role Fox News played in perpetuating a distrustful stance towards science during the 2020 coronavirus (COVID-19) pandemic (Gollwitzer, Martel, Brady, Pärnamets, Freedman, Knowles, & Van Bavel, 2020: 1186). This arguably resulted in friction between state restrictions (stay-at-home orders, social distancing, wearing masks in public etc.) and those that did not believe these policies were commonsensical as a result of the media they consumed (Gollwitzer *et al.*, 2020: 1190).

Unlike Sharp (1998) and Wang (1999), Nexon and Neumann (2006: 6-27) note that popular culture intersects with international politics in four ways: as a cause or outcome in international relations; as a medium to communicate concepts and processes; as evidence of dominant norms, ideas and identities within specific geographies; or as constituting dominant norms, values and identities with naturalizing and enabling effects.

Grayson, Davies and Philpott (2009), on the other hand conceptualize the interaction between popular culture and international politics along a popular culture and world politics continuum. For these scholars, the notion of a continuum reflects the complexity of the relationship

between popular culture and politics in that "each is implicated in the practices and understandings of the other" (Grayson, Davies & Philpott, 2009: 158). Grayson *et al.* (2009: 158) thus argue that the interaction between politics and popular culture cannot be understood through the mapping out of interactions.

Central to understanding the interaction between geopolitical actors and popular culture is the notion of a reality 'constructed' through geopolitical imaginations and fantasies. As noted by Dittmar and Bos (2019: 16), such 'mediation' of the world is geopolitical as it assigns values and behaviours to various parts of the world and this ultimately affects how people interact. This subsequently results in the construction and reconstruction of social problems, crises, enemies and leaders – all reliant on the media (Edelman, 1988: 1). Nimmo and Combs add that this construction leads to the "creation, transmission, and adoption of political fantasies as realistic views of what takes place" (1983: xv).

These 'political fantasies', which can be understood as 'geopolitical imaginations', make it much harder to keep the distinction between fact and fiction clear. Sharp (1998) notes that this is especially the case with global environmental debates. In these discussions sensational elements garner the greatest media coverage and the focus is thus directed towards climate change as a "spectacle of disaster" (Sharp, 1998: 155). This framing of climate change means that rational debate about the full range and scope of occurrences is not possible (Sharp, 1998: 153). Grayson *et al.* (2009: 157) thus note that constructed 'geopolitical imaginations' play a role in the material process of managing issues such as environmental degradation.

From the above discussion, it can be assumed that 'popular' sources of information play a powerful role in constructing geopolitical imaginations about the nature and reality of environmental issues. Furthermore, the way in which these popular sources construct these 'imaginations' have an impact on the very real process of managing these issues. Thus, in the light of the climate change issue, it is vital to understand how popular sources such as online news media platforms frame or represent the problem at hand, as this may very well have an impact on how it is managed.

2.5 Conclusion

This chapter aimed to situate this study within the broader fields of geopolitics, environmental geopolitics and popular geopolitics. Through the examination of the field of geopolitics, the importance of a critical geopolitics was made evident, demonstrating why the *representation* of issues plays a pivotal role in the way that they are responded to. Overall, the literature on

geopolitics calls for a critical examination of how issues are represented by various sources (formal, practical and popular). This is the stance adopted by this study.

Bearing in mind the notions of critical geopolitics, four broad environmental discourses were identified in this analysis: problem solving, sustainability, survivalism and green radicalism. An explanation of these environmental discourses made evident how the way in which environmental issues such as climate change were framed affected the scope of interventions and solutions. As is understood in the field of critical geopolitics, these environmental discourses may be continued by a variety of actors. Thus, the final section of this chapter explored the importance of examining how popular sources (such as news media) perpetuate the false representation of issues, thus constructing 'realities' of, for example, climate change. Overall, the literature on popular geopolitics shows that popular sources of information such as the news media are highly influential in the material management of the discussed issue. For this reason, this study highlights the importance of examining how the environmental issue of climate change has been represented in news media.

Bearing in mind the above literature review, it is clear why it is important to understand how online news media represent the climate change issue to answer the research question: *How did South African online news media construct the climate change issue during December 2019?* In doing so, the way in which climate change has been represented in media may be able to shed light on which environmental discourses prevailed at the time in South African online news media. Furthermore, this may help in understanding what 'common sense' construction of the climate change is being presented and thus what assumptions about the relationship between humans and nature are being perpetuated and which solutions the populace my deem more acceptable overall.

3 The Climate Change Issue: A Contextualisation

3.1 Introduction

This chapter will contextualise the focus of this study: climate change. Overall, it aims to provide an objective overview of the climate change issue, exploring the nature of the problem, its complexities, solutions and actors involved in its governance. To achieve this, the science of climate change and the complexity of this issue will be elaborated on briefly. After that, the impact of climate change on natural and human systems will be discussed, followed by an overview of the governing mechanisms that manage these effects. The various mitigation and adaptation solutions will be detailed. Finally, this chapter will pay close attention to climate change in the African and South African context, as this is the chosen location for this study. Overall, by exploring the full picture of climate change, this chapter lays the necessary foundation for Chapter 4, which analyses which aspects of this full picture South African online news media focus on.

3.2 Climate Science

There is consensus amongst the majority of natural and social science scholars that Earth's climate is experiencing an accelerated change in its temperature as a result of human influence (Köpsel, 2019: 1). This acknowledgement of a changing climate is verified by climate science. To understand the issue of climate change, it is necessary to give a brief, scientific account of how human influence has changed the atmospheric makeup of the Earth.

3.2.1 The Earth's Natural Greenhouse Effect

Earth's atmosphere naturally (i.e. without anthropogenic influence) has a 'greenhouse' effect. Thus, similar to a greenhouse or a glasshouse, used to grow flowers and vegetables, the Earth's temperature is determined by the amount of energy it absorbs from the Sun minus the amount it lets out back into space (Lackner, Chen & Suzuki, 2017: 5; Singh & Singh, 2013: 40). This energy that Earth takes in from the Sun (solar energy) is short-wave radiation made up mainly of ultraviolet (UV) radiation and visible 'light' (Maslin, 2014: 29).

The majority of UV radiation emitted by the Sun passes through Earth's atmosphere without hindrance (Maslin, 2014: 29). One portion of this solar energy, however, cannot get through Earth's atmosphere as a result of the presence of ozone (Maslin, 2014: 29). Ozone works by absorbing energy in the high-energy UV band thus restricting the amount that reaches Earth

(Maslin, 2014: 29). This is particularly important as UV energy of this kind is damaging to cells and DNA (Maslin, 2014: 29).

The solar energy that does enter Earth's atmosphere is absorbed into its land and oceans, warming them (Singh & Singh, 2013: 41). Once these bodies of ocean and land have been heated by solar energy, they radiate this warmth as infrared, long-wave radiation back into the atmosphere (Maslin, 2014: 29). Gases in the atmosphere absorb this radiation, thus warming the atmosphere. These gases are known as 'greenhouse gases' (GHGs) and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) (Pittock, 2010: 64) . This process produces a thermal equilibrium, acting as a "thick blanket" surrounding the Earth (Pittock, 2010: 64). Without this process, Earth would be up to 33°C colder, thus making the Earth's average temperature only -19°C as opposed to +14°C (Singh & Singh, 2013: 41). The thermal equilibrium provided by the combination of GHGs and ozone, therefore, renders Earth far more habitable (Lackner *et al.*, 2017: 7).

Earth's natural greenhouse effect as described above has created a beneficial environment conducive to the growth of life on the planet. Anthropogenic influence on this natural greenhouse effect, however, has increased the concentrations of several of these GHGs, resulting in an "enhanced greenhouse effect" (Pittock, 2010: 64). This began with the advent of the industrial revolution in the eighteenth century, marking a major turning point in human history. This newly industrialising society required large amounts of energy and material to fuel industry and build factories. This need was met through the burning of fossil fuels such as oil, coal and natural gas, and the concomitant destruction of forests (Pittock, 2010: 64).

The needs of industrialised society elevated the greenhouse effect by increasing the amount of GHGs present in the atmosphere and thus increasing the temperature on Earth. Fossil fuels for one are essentially fossilized sunlight that was deposited into the earth hundreds of millions of years ago – burning these fossil fuels releases them back into the atmosphere as CO_2 and CH_4 (Maslin, 2014: 29). Trees, on the other hand, act as 'sinks' storing large amounts of CO_2 (Nowak & Crane, 2002: 381). Once cut down, these GHGs are re-released into the atmosphere contributing to the enhanced greenhouse effect (Kindermann, Obersteiner, Sohngen, Sathaye, Andrasko, Rametsteiner, Schlamadinger, Wunder & Beach, 2008: 10301). Overall, the increased use and demand for these resources has exacerbated the Earth's natural greenhouse effect.

3.2.2 The History of Climate Change

Taking the above background into account, it is important to understand why the global climate is very sensitive to changes in GHGs. In geological terms, the Earth is experiencing a phase of global cooling. Evidence of this being the presence of huge ice sheets on Antarctica and Greenland and sea ice in the Artic Ocean (Maslin, 2014: 31). Overall, it is due to the presence of these ice sheets and sea ice that makes the global climate sensitive to changes to the atmospheric concentration of GHGs (Maslin, 2014: 31).

Evidence of the long-term cooling of the Earth started with the glaciation of Antarctica 35 million years ago, followed by the great Northern Hemisphere ice ages, 2.5 million years ago (Maslin, 2014: 31). Since this cooling, the Earth has moved between cycles glacial (ice ages) and interglacial (similar or warmer than today's temperature) stages (Maslin, 2014: 31). These ice age cycles are caused primarily by variations in the Earth's orbit around the Sun but may also be as a result of cyclical lows in solar radiation, heightened volcanic activity and changes in ocean circulation (Lackner *et al.*, 2017: 4; Houghton, 2004: 71).

At present, Earth is in an interglacial period which began around 11 650 years ago (Berger & Loutre, 2002; IPCC, 2018) . This period, known as the Holocene Period, saw the rapid increase in global temperatures by 6°C, a rise in sea levels by 120 meters and increased atmospheric CO_2 and CH_4 over 4,000 years (Maslin, 2014: 31). Although these changes in the Earth's climate seem drastic, they are not comparable to the rapid changes we are currently witnessing (Maslin, 2014: 31).

There is a scientific consensus that global temperature increases are closely linked to changes in GHG atmospheric concentrations (Maslin, 2014: 33). Thus, understanding the changes in GHGs over time provides one with a timeline of global temperature changes. CO_2, in particular, is one of the most important markers of global temperature changes as it makes up a comparatively higher concentration in the atmosphere (Lackner *et al.*, 2017: 7). Since the industrial revolution, CO_2 levels have continued to rise, starting at 260 parts per million by volume (ppmv) at the point of pre-industrialisation to 407.4 ppmv in 2018 (Lindsey, 2020). Bearing this in mind, the natural changes in atmospheric concentrations of CO_2 over the last 800 000 years (during interglacial periods) was never higher than 300 ppmv (Lindsey, 2020). Furthermore, the variation in CO_2 between these glacial and interglacial cycles was only 80 ppmv (Maslin, 2014: 37). This number is significantly less than the increase in GHG concentrations over only the last 100 years (Maslin, 2014: 37).

Climate change denialists[12] often point to the phenomenon of glacial and interglacial periods as evidence against the case for human-induced climate change. Nonetheless, it is clear that the level of atmospheric GHGs created in only one century far outweighs the natural changes that took thousands of years to occur (Maslin, 2014: 37). Furthermore, there is robust scientific consensus that the current concentration and accumulation of GHGs in the atmosphere is a consequence of anthropogenic influence (Lackner *et al.*, 2017: 4). It is for this reason that climate change is often referred to as anthropogenic climate change.

3.2.3 The Effects of Climate Change on Natural Systems

As discussed above, increased atmospheric concentrations of GHGs contribute to a rise in the overall mean temperature of the Earth. In their latest report the IPCC shows that human-induced warming reached approximately 1°C above the pre-industrial level in 2017 (IPCC, 2018). This rise in temperature has invariably resulted in changes in sea levels, local climatic conditions, and extinctions of animal and plant species (Lackner *et al.*, 2017: 9). Currently, changes are felt through changes in natural systems, resulting in chronic droughts, receding glaciers, acidification of oceans and the destruction of habitats and species (Srivastav, 2019).

To add to this, the effects of climate change felt at 1°C above pre-industrial levels are mild in comparison to predictions for the way these changes will be exacerbated as the build-up of atmospheric GHGs continues to increase, resulting in a global mean temperature that may reach 1.5°C to 2°C above pre-industrial levels (IPCC, 2018). To present a complete and objective picture of climate change, it is thus important to discuss current and future effects of climate change on natural and human systems.

3.2.3.1 Extreme Weather Conditions

In standard climatic conditions, extreme weather conditions such as droughts are considered normal and temporary (Srivastav, 2019: 9). Currently, however, there has been a widespread increase in the intensity, frequency and severity of droughts, with reports of devastating consequences (Srivastav, 2019: 9). The IPCC has reported that an increase in global mean temperatures has resulted in extreme weather conditions such as heavy precipitation, drought and dryness, runoff and river flooding, and tropical and extra-tropical cyclones (IPCC, 2018: 211).

[12] People who deny the existence of "both of the reality of climate change and of its status as a problem deserving amelioration" (McCright & Dunlap, 2011).

These extreme weather conditions are largely a result of prolonged higher than usual temperatures as a consequence of anthropogenic climate change. Higher temperatures exacerbate high moisture retention in the atmosphere in some areas (resulting in prolonged droughts) and high rainfall in other areas (causing flash floods, erosion and mudslides) (Srivastav, 2019: 9). Areas that are affected by flash floods and soil erosion face additional droughts, because such extreme rainfall patterns lead to less moisture retention in the soil (Srivastav, 2019: 9).

The Niger Basin in West Africa, for example, is already being affected by these climate change impacts. Over the past three decades the region has experienced recurrent droughts in Benin (1984) and Niger (1985), extreme weather in Nigeria (causing major damage to the Abuja National Stadium in 2003) and the shrinkage and gradual disappearance of Lake Chad (Okpara, Tarhule & Perumal, 2013: 4). Furthermore, the IPCC forecasts that as the global mean temperature continues to rise by 1.5°C, West Africa will continue to experience more frequent heatwaves and hot nights (IPCC, 2018: 259).

3.2.3.2 Receding Glaciers

There are two main types of glaciers: *alpine glaciers* (found in mountain terrain) and *continental glaciers* (continental cover associated with the ice ages) (Srivastav, 2019: 11). As a result of increased global temperatures, over the last 150 years alpine glaciers such as those in the Himalayas and continental glaciers such as those in Antarctica and Greenland have been in a state of decline (Srivastav, 2019: 11).

The receding of alpine glaciers in the Himalayan mountains, for example, is occurring at such a rapid pace that lakes and rivers are being filled too quickly, resulting in floods and landslides (Srivastav, 2019: 11). This phenomenon is known as a glacial lake outburst flood (GLOF) and may pose an immediate threat to millions of lives. (Riaz, Ali & Baig, 2015: 1). During the 20th century, the Himalayan belt witnessed an increase in the frequency and intensity of GLOFs (Riaz *et al.*, 2015: 5). In 2013, communities living in the Reshun Valley were victims of one of these devastating GLOFs, generated by the melting Reshun Glacier (Riaz *et al.*, 2015: 6). The resulting damage included the loss of 40 houses, 30 animal corrals, 20 shops and a great deal of cultivated land (Riaz *et al.*, 2015: 6).

3.2.3.3 Acidification of Oceans

Earth's oceans affect the climate in three principal ways: "i) Transfer of huge amount of water vapour between sea and air; ii) Transport of considerable amount of heat from tropics to the poles and iii) Being a huge reservoir of CO_2 (50 times more than atmosphere), they maintain Earth's heat balance" (Srivastav, 2019: 11). Overall, the ocean's ability to be a CO_2 reservoir is dependent on the chemical properties of the CO_2 in the water, the presence of a 'biological pump'[13] and the rate and pattern of ocean circulation (Srivastav, 2019: 11–12).

It is clear that the ocean's ability to absorb so much CO_2 at such a rapid rate (no other mechanism has this ability) is essential for the prosperity and survival of humankind (Feely, Sabine & Victoria, 2006). In the light of anthropogenic global warming, however, the increased uptake of carbon dioxide by oceans has begun to change its basic chemistry (Feely *et al.*, 2006). As the ocean continues to absorb excessive levels of CO_2 from the atmosphere, it becomes increasingly acidic[14] (Feely *et al.*, 2006).

This acidification of the ocean has direct and indirect consequences for marine organisms (coral, mussels, snails and sea urchin), a few invertebrate organisms and fish (Srivastav, 2019: 12). Changes in the chemistry of seawater may, for example, affect the pH of body fluid regulatory mechanisms, enzyme activity and protein functions in many organisms (Gattuso & Hansson, 2011: 5). Furthermore, processes such as calcification and photosynthesis may also be altered (Gattuso & Hansson, 2011: 5). These consequences subsequently impact on seafood resources and coral reefs and ultimately on human wellbeing (Gattuso & Hansson, 2011: 14).

The ways in which ocean acidification affects seafood resources, for example, include how increases in carbonic acid alters the calcification process of many species of shellfish that form important components of many diets such as that of the blue mussel and the Pacific oyster (Gattuso & Hansson, 2011: 14). Other impacts include the way in which ocean acidification has effects on the metabolism, reproduction, prey and habitat loss of many sea creatures (Cooley & Doney, 2009). Although some marine species may have the capacity to adapt to ocean acidification, the decline or disappearance of certain organisms has run-on effects for marine food webs (Cooley & Doney, 2009).

[13] "Biological Pump – Phyto-planktons on ocean surface that carry huge quantity of CO2 to the ocean floor where it stays for hundreds of years" (Srivastav, 2019: 11).
[14] "When carbon dioxide is absorbed by oceans it reacts with seawater to form carbonic acid" (Feely *et al.*, 2006).

Coral reef ecosystems are especially sensitive to changes in both pH balance and temperature, thus making them especially vulnerable to ocean acidification (Hoegh-Guldberg, Mumby, Hooten, Steneck, Greenfield, Gomez, Harvell, Sale, Edwards, Caldeira, Knowlton, Eakin, Iglesias-Prieto, Muthiga, Bradbury, Dubi & Hatziolos, 2007). The destruction and degradation of coral reefs is especially worrying as they have an incredibly rich biodiversity, and are ecologically vital for food and reproduction (Gattuso & Hansson, 2011: 14). Furthermore, coral reefs ensure important protection for ecosystems such as mangroves and seagrass beds – ecosystems that in turn play a role in securing shorelines from erosion (Gattuso & Hansson, 2011: 14). The Great Barrier Reef, for example, is the world's largest coral reef and has experienced recurrent bleaching in 1998, 2002 and 2016 (Hughes *et al.*,2017). Despite efforts to managing fishing and water quality, extreme heat has resulted in the loss of hundreds of individual reefs that make up this vital ecosystem (Hughes *et al.*, 2017)

3.2.3.4 Rising Sea Levels

As mentioned in the previous sections, the increase in the global mean temperature has resulted in the melting of continental and alpine glaciers, causing GLOFs and the acidification of oceans, resulting in (among other things) coral bleaching and loss of marine organisms. Climate change also contributes to rising sea levels through both these channels. Firstly, glacial runoff from grounded ice from glaciers and ice sheets eventually makes its way into the ocean, thus increasing the amount of water in the sea (Dessler, 2012: 143; Singh & Singh, 2013: 52). Secondly, as the oceans warm, water expands through thermal expansion, thus increasing the volume of water in the ocean (Dessler, 2012: 143).

In their 2019 *Special Report on the Ocean and Cryosphere,* the IPCCC notes that the sea level has risen 20 cm since 1990 (IPCC, 2019: 112). Owing to the timescale at which glaciers melt (see section 3.4.2), sea levels are expected to continue to rise for many more centuries (IPCC, 2019: 112). This fact is especially concerning for vulnerable populations living in low-lying coastal nations and for Small Island Developing States (SIDS).

The city on Cotonou in Benin, for example, is vulnerable to sea-level rise because it is located on a low-lying sand barrier and has limited adaptation ability (Dasgupta, Laplante, Murray & Wheeler, 2009). Furthermore, a rise in sea level in Cotonou is expected to trigger a number of other climate-related phenomena such as the erosion of coastal areas and riverbanks, flooding and salt water intrusion in Lake Nokoué (Dossou & Glehouenou-Dossou, 2007: 67). These

physical effects will ultimately have run-on effects for the functioning of coastal and lagoon ecosystems (Dossou & Gléhouenou-Dossou, 2007: 67).

Overall, Cotonou is considered especially vulnerable, not only because of the direct consequences of sea-level rises, but also because of their adaptation capacity. Unfortunately, this is the case for many African nations. It is for this reason that the severity of climate change impacts is not only aggravated by the intensity of climatic events, but also by the ability and resources of affected communities to adapt.

For Cotonou, as for many other communities affected by the repercussions of climate change, the physical effects are only the beginning of the story. As ecosystems are depleted and altered and temperatures rise, the impact that climate change has on natural systems inevitably begins to encroach on the vital pillars of society such as health, food, shelter, sanitation and migration. This shows starkly that the fate of humankind is not separate from the course of nature.

3.3 Climate Change and Society

This study focuses on the interaction between the phenomenon of climate change and society, with the aim of uncovering what shapes this interaction. For this reason, it is important to understand why and how a scientifically observable phenomenon such as climate change interacts with systems that define the quality of human life such as the food security, health, water and sanitation, shelter and settlement and migration.

3.3.1 Food Security

Climate change has and will continue to affect food security around the world by altering agricultural norms and affecting fisheries. Campbell, Wollenberg, Vermeulen, Girvetz, Loboguerrero, Ramirez-Villegas, Aggarwal, Corner-Dolloff, Rosenstock, Sebastian & Thornton (2016: 37-38) show how food security in this sense refers to (1) the quality and quantity of crops, livestock and fisheries; (2) access to food (in terms of affordability, markets and policies); (3) food quality and diversity; and (4) the stability of the environment.

The quality and quantity of crops will be affected not only by the rise in the average global mean temperature, but also as a result of the rise in atmospheric CO_2. Research shows that increases in the average mean temperature will lead to a decrease in crop yields of rice, maize and wheat – staple foods for the majority of humans (Challinor, Watson, Lobell, Howden, Smith & Chhetri, 2014). Additionally, the increased concentration of CO_2 in the atmosphere is widely understood to affect the quality of crops (DaMatta, Grandis, Arenque & Buckeridge,

2010). In sub-Saharan Africa these effects are already being felt by pastoralists and agro-pastorialists (Kebede, Hasen & Negatu, 2010; Songok, Kipkorir, Mugalavai, Kwonyike & Ng'weno, 2011). Extreme droughts have hampered community's ability to grow food and rear livestock, and forced farmers to adapt to new water regimes to maintain their food security (Kebede *et al.*, 2010; Songok *et al.*, 2011).

The quality and quantity of crops, in particular, have a run-on effect for livestock systems as this affects the quality and quantity of livestock feed (Campbell, Wollenberg, Vermeulen, Girvetz, Loboguerrero, Ramirez-Villegas, Aggarwal, Corner-Dolloff, Rosenstock, Sebastian & Thornton, 2016: 37). In addition to changes in livestock feed, climate change also brings with it changes in the prevalence of diseases and pests, which leads to physiological stress in livestock animals (Thornton & Gerber, 2010). Overall, this will impair the growth of animals (meat) and affect egg and milk yields (Thornton & Gerber, 2010).

Finally, as a result of ocean acidification (discussed in section 3.3.1.3), fisheries will also be impacted by climate change. These changes in crops, livestock and fisheries will affect the supply chain and trade flows of these food sources, thus affecting people's access to food (Campbell *et al.*, 2016). For some population groups, this will mean changes in the affordability of food (Campbell *et al.*, 2016: 37).

Food security itself, however, is not limited to the access to food by populations, but also security for those who rely on food production to make a living. Because climate change exacerbates the pressure on ecosystems, it also threatens the socio-economic components of agricultural systems (Campbell *et al.*, 2016: 38). This is especially so for resource-poor and marginalised populations

Finally, as global temperatures rise, so too does the rate of microbial growth in food such as fresh fruit, vegetables and fisheries (Hammond, Brown, Burger, Flanagan, Fristoe, Mercado-Silva, Nekola & Okie, 2015; Liu, Hofstra & Franz, 2013; Marques, Nunes, Moore & Strom, 2010). Thus, because nutrition is so intricately linked to food security, climate change is also expected to affect the health of many populations by increasing levels of hunger, illness and death as a result of malnutrition (Costello *et al.*, 2009: 1704).

3.3.2 Water and Sanitation

The dynamics of water systems are vital for sustaining human life. Thus, changes in these dynamics as a result of climate change affects human systems directly and indirectly. Directly,

climate change affects availability of and access to water. Indirectly, these changes to water dynamics interact with human settlement infrastructure, which has implications for human health.

The IPCC has concluded that the quality and quantity of freshwater resources will be affected by climate change, threatening water security and water availability (IPCC, 2018: 213). At present, the water security of around 80% of the world's population is under threat (Rüttinger *et al.*, 2015: 10). This is largely because of changes in rainfall patterns as a result of extreme weather patterns, in addition to the magnitude of glacial runoff and direction of specific glacial changes (Rüttinger *et al.*, 2015: 10). Overall, climate change will make providing clean water and ensuring good sanitation and drainage far more complicated.

Access to clean water is vital for good sanitary hygiene and health; it thus follows that the changes in the quality and quantity of water will compromise human health. Costello *et al.* note that in human settlements with poor infrastructure this increases the risk of exposure to contaminated water in addition to creating environments conducive to the thriving of mosquitoes (Costello *et al.*, 2009: 1705). This, in turn, increases the prevalence of water-borne and vector-borne diseases (Costello *et al.*, 2009: 1705).

3.3.3 Shelter and Human Settlements

The effects of climate change require making provision for both emergency shelter and the creation of settlements that are resilient in the increasingly evident reality of climate change. Urban populations in river deltas are experiencing increased flooding and coastal cities are predicted to be severely affected by rising sea levels (McBean & Ajibade, 2009: 179). The damage to human settlements caused by climate change are monumental and include loss of human life, displacement, property damage and disruption of daily activities (McBean & Ajibade, 2009: 179).

This is especially the case in developing countries in terms of urbanisation. In these countries urbanisation is linked to environmental vulnerability (Costello *et al.*, 2009: 1705). Often, low-income communities are driven by poverty and unemployment to relocate to urban areas with hazardous physical environments (McBean & Ajibade, 2009: 179). Increased urbanisation in highly populated urban areas make poorer populations particularly vulnerable to climate change hazards such as floods and landslides (Costello *et al.*, 2009: 1705). In these cases, poorer populations are the most at-risk because they are vulnerable to physical exposure to hazards in addition to their limited capacity and capital to adapt to such situations (McBean &

Ajibade, 2009: 179). Thus, poverty reduction forms one of the solutions to address the challenges climate change will create for human settlement and shelter.

Overall, climate change will necessitate two vital adaptations to urban settlement. Firstly, it will entail the restructuring of urban settlements so that they contribute less to climate change (e.g. green housing and energy-efficient homes) (Costello *et al.*, 2009: 1706). Secondly, it is important that human settlements take steps to become more climate-resilient (Costello *et al.*, 2009: 1705). These adaptations are discussed in more detail in section 3.6.

Figure 1: Exposure of African cities with at least one million people to natural hazards - Adapted from UNDESA (2012) by Di Ruocco, Gasparini & Guy (2015)

Taking into account the above, the growth of Africa's urban populations and living conditions is particularly worrying, making the issue of urban settlement in the light of climate change hazards a particularly concerning issue (Di Ruocco, Gasparini & Guy, 2015: 1).

Africa has the highest urban population growth in the world – with many inhabitants living in cities with populations of more than one million (Di Ruocco *et al.*, 2015: 1). Of these highly populated cities, almost all of them are vulnerable to climate change-related hazards such as cyclones, droughts, earthquakes, floods, landslides and volcanoes (Di Ruocco *et al.*, 2015: 6). The areas of high vulnerability are depicted in Figure 1.

3.3.1 Patterns of Disease and Mortality

Through changes in weather and temperature, climate change will alter the current patterns of disease and mortality (Costello *et al.*, 2009: 1702). Changes in global temperature, for one, are expected to increase mortality rates in some regions as a result of thermal stress, cardiovascular and respiratory illness, and an increasing frequency of infectious vector-borne diseases (Husain & Chaudhary, 2008). This is largely because rising temperatures and some extreme weather events contribute to the spread and transmission of vector-borne diseases by affecting the survival rates of pathogens (Costello *et al.*, 2009: 1702; Wei *et al.*, 2012). Thus, malaria, tick-borne encephalitis and dengue fever will become increasingly prevalent or may spread to new areas (Patz, Campbell-Lendrum, Gibbs & Woodruff, 2008: 33). The malaria pathogen, for instance, has spread to previously malaria-free areas such as the highlands of Ethiopia, Rwanda, Kenya and Burundi as rainfall patterns change (World Bank, 2013: 54).

The modification of ecosystems through climate change and other anthropogenic interference also risks causing disastrous disease outbreaks (Aguirre & Tabor, 2008; Costello *et al.*, 2009). As a result of a loss of biodiversity, climate change has changed the makeup of competent and incompetent hosts[15] for disease (Costello *et al.*, 2009: 1704). Because competent hosts often thrive in species-poor communities,[16] vectors (such as humans) are more likely to become infected (Costello *et al.*, 2009: 1704). In line with this reasoning, Schmeller, Courchamp and Killeen (2020: 3095) warn that outbreaks of emerging infectious diseases such as COVID-19 due to intensifying pathogen emergence can be attributed to climate change, biodiversity loss and habitat degradation.

[15] "Species might be competent or incompetent in transmitting a disease to vectors that feed upon them" (Costello *et al.*, 2009: 1704).
[16] Lacking in biodiversity.

Overall, Wei, *et al.* (2012) note that these changes in mortality and disease are determined by a region's ability to respond effectively to stresses (Wei *et al.*, 2012). People living in the developing world are therefore expected to be affected disproportionately by the health-related implications of climate change (Lemery & Auerbach, 2017: 14). Thus, climate change will further exacerbate problems in a country's health resources if issues such as poor health infrastructure, poverty and inequality are already high issues (Costello *et al.*, 2009: 1703)

Climate change will not only affect human health by altering food security and changing patterns of disease and mortality, but also by impacting water and sanitation; shelter and human settlements; and population and migration (Costello *et al.*, 2009: 1702). Taking into account the two previous sections, it is clear that the effects that climate change has on human systems are often interlinked.

3.3.2 Population and Migration

Throughout human history, populations have responded to extreme weather conditions by migrating to a different region (Marris, 2014). In 2019, the World Bank estimated that "by 2050 – in just three regions [Sub-Saharan Africa, South Asia and Latin America] – climate change could force more than 143 million people to move within their countries" (Rigaud *et al.*, 2018).

Although the link between climate change and migration is a complicated one, several climate change events can contribute towards different forms of migration. These include migration as a result of slow-onset or fast-onset events which may directly or indirectly compel migration (Bardsley & Hugo, 2010; Bohra-Mishra, Oppenheimer & Hsiang, 2014).

Coastal erosion, for example, is an example of a direct, slow-onset climate event that may force inhabitants of an area to migrate (Cattaneo *et al.*, 2019: 191). If however, this coastal erosion was not gradual, but as a result of a hurricane or flood and inhabitants had to flee, it would be considered a direct fast-onset event (Cattaneo *et al.*, 2019: 191). An example of an indirect climate event that may force migration is progressive desertification, which may hamper traditional farming practices, thus decreasing agricultural productivity and affecting the livelihoods of inhabitants (Cattaneo *et al.*, 2019: 191). In this instance, inhabitants may migrate to regions with better agricultural opportunities.

East Africa in particular is a prime example of a region where droughts and desertification have spurred migration. This is largely because of the region's dependence on rain for agriculture in

combination with its moderate population growth, unequal development and lack of economic, development and institutional capacity (Rigaud *et al.*, 2018; WWF, 2006). The 2011 drought and mass migration in eastern Africa and the Horn of Africa affected regions such as Djibouti, Ethiopia, Kenya and Somalia, causing large-scale internal and international displacement of hundreds of thousands of people (Achour & Lacan, 2012: 75; Drought Highlights in 2011, 2011).

Overall, it is clear that the natural and human effects of climate change are interlinked – with one adding on to the other. It is also clear that climate change will impact on the most basic pillars of human survival and has upset the balance of vital natural systems – and will continue to do so. The complexity of the climate change issue, however, is not limited to the interconnected nature of its effects. In addition to these effects, it is necessary to take into account aspects of climate change such as the systematic, cumulative, global nature of the problem. Furthermore, tipping points, time scales and equity issues must also be taken into account. It is for this reason that climate change poses such a monumental challenge for policymakers and governance mechanisms. These complexities will be discussed in the next section.

3.4 The Complexity of Climate Change

As noted above, the climate change problem is far more complex than the sum of its effects. Rutherford and Weber note that "few subjects are as complex and as frequently oversimplified as climate change" (Rutherford & Weber, 2017: 128). For this reason, to gain an objective understanding of climate change, it is vital to acknowledge its complexity.

Steffen (2011) identifies several features of climate change that account for its complexity, including systematic global changes, cumulative global changes, time scales, tipping points, issues of equity.

3.4.1 Systematic and Cumulative Global Changes

Firstly, climate change is *global* in that it is governed by the atmosphere and oceans (Steffen, 2011: 2). The global nature of these channels means that material and energy in one area of the planet is circulated throughout the world, thus effecting systematic global changes (Steffen, 2011: 2).

Secondly, changes in terrestrial land, such as the conversion of forest to cropland, alter the functioning of the terrestrial biosphere within the climate system (Steffen, 2011: 2). Unlike

changes in the atmosphere and ocean, these effects are often local and regional (Steffen, 2011: 2). That being said, changes in the terrestrial biosphere can result in cumulative global changes where deforestation in one area may have global impacts via teleconnections in the atmosphere-ocean system (Steffen, 2011: 2). For example, in a study by Snyder, Delire and Foley (2004), it was shown that precipitation globally is affected by the removal of certain vegetation biomes.

Fiorino discusses these impacts as 'positive feedback loops', arguing that such phenomena make the impacts of climate change hard to predict because the causes of climate change can also work to reinforce it (Fiorino, 2018: 10). An example of this includes how climate change and the consequent global heating has resulted in the melting of permafrost in the northern latitudes of the world. As a result of this melting permafrost, carbon emissions have increased, further contributing to climate change (Fiorino, 2018: 10).

3.4.2 Time Scales

Time scales further complicate the nature of climate change. Human-driven climate change, in particular, operates in time scales that long precede the human decision-makers of today (Steffen, 2011: 2). Features of the climate system such as carbon dioxide, temperature increase, sea-level rise and the extinction of biological species all operate on time-scales that are far longer than human lifespans (Steffen, 2011: 2).

Carbon dioxide emitted into the atmosphere remains there for on average 100 years (Steffen, 2011: 2). Failure to reduce emissions thus leads to an accumulation of the gas in the atmosphere that continues to influence the climate for many decades (Steffen, 2011: 2). Schrag has noted that although there are many other time scales in the climate system, the CO_2 cycle is the longest (Schrag, 2018: 3). He thus argues that "it remains uncertain how long warming will continue even after CO_2 levels stabilize" (Schrag, 2018: 3).

Temperature increases also present a challenging prospect. Scientists have noted that even if GHG emissions were to be eliminated from the atmosphere tomorrow, the planet's temperature would continue to rise for several more decades (Steffen, 2011: 2). Thus, the rate of temperature increases over the next two or three decades will not simply be the result of present-day GHG emissions. Furthermore, cuts in current GHG emissions will not yield benefits for at least two or three decades (Steffen, 2011: 2).

Domingues *et al.* have shown that central to sea-level rise is thermal expansion of the oceans (Domingues, Church, White, Gleckler, Wijffels, Barker & Dunn, 2008). As climate change

continues, however, this is not the only factor to take into consideration. The dynamics and changes in large polar ice sheets in areas such as Greenland and Antarctica are now important factors to consider with regard to rising sea levels (Steffen, 2011: 2). Estimates by paleoclimate data suggest that, for example, the Greenland ice sheet most likely cannot survive with atmospheric concentrations higher than 400 ppmv (the current level) (Schrag, 2018: 4). The Greenland ice sheet on its own has the capacity to contribute to more than seven meters rise in sea levels (Schrag, 2018: 4). The melting of such ice sheets, however, occurs on time scales of thousands of years, thus implicating thousands of policymakers and governments (Schrag, 2018: 4).

3.4.3 Tipping Points

Finally, the phenomenon of tipping points make the battle against climate change far more urgent. In the last decade the issue of climate change has developed the feature in which "an apparently small, insignificant change in a forcing variable can trigger an unexpected large and rapid or irreversible change in a major feature of the climate system" (Steffen, 2011: 4). These tipping points can be understood as critical thresholds that, once crossed, increase the risk of worst-case scenarios (IPCC, 2018: 262). Furthermore, once such thresholds or tipping points have been, the consequences are often irreversible (Fiorino, 2018: 10).

Tipping points are of particular concern as evidence is mounting that they will have high impacts and are connected across various biophysical systems, compromising the entire planet (Lenton, Rockström, Gaffney, Rahmstorf, Richardson, Steffen & Schellnhuber, 2019: 592). Lenton *et al.* thus argue that "the considerations of tipping points helps to define that we are in a climate emergency" (Lenton *et al.*, 2019: 592). Furthermore, examples of tipping points are currently evident in ice collapse and the breaching of biosphere boundaries.

3.4.3.1 Ice Collapse

Large polar ice sheets such as the Amundsen Sea embayment sector (West Antarctica), the Wilkes Basin (the East Antarctic ice sheet) and the Greenland ice sheet have passed or are approaching their tipping points (Lenton *et al.*, 2019: 592). Studies have shown that the West Antarctic Ice Sheet (WAIS) passed its tipping point decades ago (Spratt, 2017: 2).

The Amundsen Sea embayment sector of the WAIS, for example, is believed to be destabilised with the 'grounding line' retreating (Spratt, 2017: 2). Because this tipping point has been reached, ice retreat in this area is unstoppable and even if there was no further acceleration in

climate change, the collapse of the rest of the WAIS will ensue (Spratt, 2017: 2; Rignot, Mouginot, Morlighem, Seroussi & Scheuch, 2014). This, in turn, will contribute to a worldwide sea-level rise of one meter (Spratt, 2017: 2; Rignot *et al.*, 2014).

3.4.3.2 Biosphere Boundaries

Climate change as a result of human activities other than GHG emissions may also trigger tipping points in a range of ecosystems (Lenton *et al.*, 2019: 593). An example of how additional anthropogenic influence overrides biosphere boundaries is the deforestation of the Amazon.

Many studies have recognised the importance of the Amazon rainforest within the Earth system (Boers, Marwan, Barbosa & Kurths, 2017; Nobre & Borma, 2009). Not only is it a carbon pool for local climate stability, but also regional climate stability (Nobre & Borma, 2009). Anthropogenic disturbances of the Amazon have driven environmental change in this key rainforest through deforestation, forest degradation and fragmentation, climate change, increased atmospheric concentrations of CO_2 and forest fires (Nobre & Borma, 2009: 28).

Deforestation (in combination with forest degradation, fragmentation and climate change) and increased forest fires in the Amazon runs the risk of pushing its biosphere boundaries in the area towards a tipping point (Nobre & Borma, 2009: 33). If these boundaries are breached, the rainforest will begin rapidly transforming into a grassland or savannah-type ecosystem (Steffen, 2011: 4). In their study, Boers, *et al.* found that when deforestation went beyond between 30% and 50% of the Amazon basin (East to West), there was a 40% decrease in precipitation in areas that had not been deforested (Boers *et al.*, 2017).

3.4.4 Equity Issues and Climate Justice

One of the most contested aspects of climate change has to do with the equitable distribution of blame and responsibility. Because of the nature of carbon dioxide (as discussed above), it is the cumulative emissions of GHG from 1750 to the present day that have resulted in climate change as it is known of today (Steffen, 2011: 3). This makes placing responsibility for the current state of the climate difficult.

In a study by Raupach, Marland, Ciais, Canadell, Klepper & Field (2007), it was found that 75% of these cumulative emissions were produced by OECD[17] countries and the former Soviet

[17] The Organisation for Economic Co-operation and Development (OECD) consists of: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland,

Union. Steffen thus argues that "wealthy countries have largely consumed the capacity of the atmosphere to absorb the wastes of industrial metabolism, leaving very little for the developing world to use in their quest to bring their populations out of poverty" (Steffen, 2011: 3).

Adding to the justice and equity issue that climate change raises is the fact that the consequences of 'dangerous' climate change are not distributed equally across the globe. Steffen notes that the consequences of climate change are felt far more by developing countries than by developed countries (Steffen, 2011: 3).

It is clear from the above sections that the study of climate change must be interdisciplinary, taking into account both climate science (natural science) and social sciences. This is because shifts in the global mean temperature and climate fundamentally change life-support systems for humans (physical, chemical and biological) in addition to affecting the core of contemporary society (energy systems, lifestyles, institutions and governance, forms of economic organisation and basic values) (Steffen, 2011: 1). The climate change issue thus demands rigorous governance. The next section provides an overview of these mechanisms to govern climate change.

3.5 Governing the Anthropocene

Climate change is global and thus demands global solutions – national and regional action alone is not enough (Saran, 2009: 457).

In 1985 at a conference sponsored by the International Council of Scientific Unions in collaboration with the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP), the first collective scientific warning against rising global temperatures was issued: "…it is now believed that in the first half of the next century, a rise in global mean temperature could occur which is greater than any in human history" (Pittock, 2005: 247).

Three years later, 300 scientists at the UN Conference on the Changing Atmosphere demanded action to reduce CO_2 emissions (Pittock, 2005: 247). Subsequently, the UNEP set up the Intergovernmental Panel on Climate Change (IPCC), which was tasked with reporting back to the Second World Climate Conference in 1990 with scientific information on the climate issue and realistic solutions (Pittock, 2005: 247). Guided by these findings, the UNFCCC was signed

Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

at the Rio Earth Summit in 1992, coming into force two years later, ratified by 189 member parties (Pittock, 2005: 261). This is arguably the first major milestone in climate governance.

The architecture of global climate change governance was and continues to be sustained by three critical institutions: The United Nations Framework Convention on Climate Change (UNFCCC), the Conference of the Parties (COP) and subsidiary bodies.

3.5.1 The Structure of Global Climate Change Governance

UNFCCC is an international legal framework that seeks to provide organisational and technical support, rather than specific details on implementation (Gupta, 2016: 4). In this way, the convention is understood as a 'framework' in that it is broad and acts more as a facilitating power (Bulkeley & Newell, 2010: 18; Pittock, 2005: 248). The UNFCCC does this by facilitating and organising negotiations, preparing the necessary documentation and managing the tracking of emissions by projects (Bulkeley & Newell, 2010: 17). Although the Convention acts as a facilitator, it plays a pivotal role in shaping the outcomes of negotiations (Bulkeley & Newell, 2010: 17).

The signatures of the UNFCCC form the COP (Congress of the Parties). The COP works as the decision-making body of climate negotiations (Bulkeley & Newell, 2010: 18). This body has annual meetings during which commitments contained in treaties are evaluated and updated according to scientific advice (Bulkeley & Newell, 2010: 18).

Finally, issue-specific negotiations are taken up by two permanent subsidiary bodies, SBI (Subsidiary Bodies on Implementation) and SBSTA (Scientific and Technological Advice) in addition to temporary Ad Hoc Working Groups (Bulkeley & Newell, 2010: 18).

3.5.2 The Kyoto Protocol

Starting with the first meeting of the COP (COP-1) in Germany in 1995, negotiations centre on strengthening efforts to combat climate change (Pittock, 2005: 248). At COP-1, this took shape in the Berlin Mandate, in which binding commitments were made by industrialised countries to reduce emissions (Bulkeley & Newell, 2010: 20). The Berlin Mandate thus began negotiations towards a legally binding protocol to reduce GHG emissions and promote Quantifiable Emissions Limitations and Reduction Obligations (QELROs) (Bulkeley & Newell, 2010: 22).

In 1997 the Kyoto Protocol was signed after Parties had agreed on assigned amounts of 'total allowed emissions' per country for the first commitment period (Pittock, 2005: 249). This extension of the UNFCCC bound 38 industrialised (or Annex 1[18]) countries to reduce their GHG emissions to 5.2% below 1990 levels during the period 2008-2012 (Bulkeley & Newell, 2010: 22).

Three mechanisms were set out to aid developed countries to meet this commitment. Firstly, through Joint Implementation (JI), countries were able to create emissions 'credit' or generate and transfer emissions reductions by investing in a project in other Annex I counties (Pittock, 2005: 249). Secondly, an Emissions Trading Scheme made provision for the sale of emissions allowances between Annex I countries (Pittock, 2005: 249). Finally, through a Clean Development Mechanism (CDM), Annex I countries could also create emissions 'credit' by investing in projects in non-Annex I countries (Pittock, 2005: 249). Overall, the mechanisms developed through the Kyoto Protocol made carbon credits a new globally traded commodity (Gupta, 2016: 4).

After the signing of the treaty, aspects of the Kyoto Protocol led to disagreements, particularly between the United States (USA) and Europe (Bulkeley & Newell, 2010: 21). After negotiations in Buenos Aires in 1998 (COP-4) and The Hague in 2000 (COP-6), the US withdrew from the Kyoto Protocol (Bulkeley & Newell, 2010: 21). The USA argued that the treaty was flawed and would damage their economy as certain developing countries were excused from emission-reduction targets (Pittock, 2005: 249).

Although the Kyoto Protocol was signed in 1997, it was ratified only in 2005. For the Protocol to come into force, it required ratification by at least 55 countries (or by enough countries to make up 55% of CO_2 emissions in 1990) (Pittock, 2005: 249). This threshold ultimately meant that a certain number of Annex I countries had to ratify the Protocol as the majority of CO_2 emissions in 1990 came from these states. By 2004, 122 countries had ratified the Protocol, however, this only made up 44.2% of CO_2 emissions, as only 32 Annex I countries had

[18] The UNFCCC acknowledges that different countries have emitted different amounts of GHGs and thus need to make varying amounts of effort to reduce emissions (Maslin, 2014: 167). Two different groups of parties are thus recognised:

Annex I: Industrialised developed countries and economies in transition (EITs)
Annex II: The richest of Annex I countries (OECD countries)
Non-Annex I: Low incomes and developing countries (Maslin, 2014)

approved it (Pittock, 2005: 250). In November 2004, however, Russia added its name to the Protocol, allowing it to come into force as of 27 May 2005 (Pittock, 2005: 250).[19]

After the ratification of the Kyoto Protocol, Parties and scientists were aware that failure to renew the agreement after the 2008-2012 agreement would derail and disrupt the groundwork for the commitment period (Gupta, 2016: 4). Bearing in mind how long it took for the Protocol to be ratified, this was especially concerning. It was thus a historic success when a second commitment period was agreed for 2013-2020 through the Doha Amendment, a few days before the Kyoto Protocol period expired (Gupta, 2016: 5).

3.5.3 The Paris Agreement

In the years leading up to the end of the commitment period of the Kyoto Protocol, various attempts at creating a climate agreement that was fair, balanced, ambitious and, most importantly, adopted by world powers that had been tied up in debates for decades such as the EU, India, China, the USA and Small Island States (SIDS) (Dimitrov, 2016: 1). These included negotiations around the Copenhagen Accord and the Cancun Agreement. As GHGs continued to rise, despite the Kyoto Protocol, disputes centred on "internationally agreed and legally binding emissions targets" (Falkner, 2016: 1111). For this reason, the Paris Agreement is considered a political success in both traditional state diplomacy and climate negotiations (Dimitrov, 2016: 1).

After 20 years of negotiations, in 2015 the Paris Agreement was produced with the ultimate aim to "keep the global mean surface temperature well below 2°C above the preindustrial mean and, if possible, to limit the increase to 1.5°C" (Falkner, 2016: 1107; Lawrence & Schäfer, 2019: 829). The Paris Agreement was unique in that it recognised the power of domestic politics in climate change policy and thus allowed countries to set a personalised level of commitment to climate change mitigation – Nationally Determined Contributions (NDCs) (Falkner, 2016: 1107). This being said, the treaty does did not leave mitigation to purely bottom-up efforts but rather introduced a system of 'country pledges' creating an international system of accountability (Falkner, 2016: 1107). Lawrence and Schäfer deem this a "much needed source of democratic renewal for global climate politics" (Lawrence & Schäfer, 2019: 829).

[19] It should be noted that only Parties who ratified the Kyoto Protocol were legally bound to emission-reduction targets (Pittock, 2005: 250).

The Paris Agreement's mitigation efforts also differ from those of the Kyoto Protocol in that they require all emitters to submit commitments to reduce emissions – not just Annex I countries (Falkner, 2016: 1116). The Paris Agreement does this while continuing to uphold the UNFCCC principle of "common but differentiated responsibilities and respective capabilities" by only 'encouraging' LDCs to submit commitments, taking into account their economic growth (Falkner, 2016: 1116).

In addition to mitigation measures, the Paris Agreement made some headway in terms of climate change adaptation, as was advocated by developing countries (Falkner, 2016: 1116). This was achieved by linking the Paris Agreement to previously established progress made on the climate change adaptation front such as National Adaptation Programme of Action (NAPA) and other National Adaptation Plans (NAPs) such as the Warsaw International Mechanism on Loss and Damage associated with Climate Change (United Nations Climate Change, 2019: 15). In this way, NAPs were linked to funding from the Green Climate Fund (GCF) and structures were put in place for Parties to report on adaptation (United Nations Climate Change, 2019: 15).

It can be gleaned from the above that governing a complicated global phenomenon like climate change is no easy feat. Although agreements such as the Kyoto Protocol and the Paris Agreement were brought to fruition, they were not signed without many years of debates. It is clear from the nature of disagreements between Parties that there is a fundemental disagreement about on whom the onus and responsibility for dealing with enhanced global warming should fall (developing or developed countries?). Furthermore, it is clear that disagrements about the solutions to the climate change problems are mostly considered in the light of how they may affect economic development. In the next section, some of these solutions are explored.

3.6 Climate Change Mitigation and Adaptation

As noted above, because of the global nature of climate change, structures such as the UNFCCC, COP and international treaties are necessary to manage climate change. These actors thus constitute the regulation and enforcement aspect of handling climate change (Kazi, 2017: 56). Agreements such as the Paris Agreement ultimately oversee measures such as climate change mitigation and adaptation. While adaptation acknowledges that countries already have to manage the effects of climate change, mitigation is more future-focused.

Climate change mitigation works to limit the extent of the damage caused by climate change (Lackner *et al.*, 2017: 10). This is done through measures that manage GHGs (Kazi, 2017: 55).

Simply put, climate change mitigation is "reducing our carbon footprint and thus reversing the trend of ever-increasing GHG emissions" (Maslin, 2014: 203).

The major sources of GHGs have been identified as the burning of fossil fuels (coal, oil and gas) and deforestation (Lackner *et al.*, 2017: 12). Thus, it seems that a simple solution such as cutting back on the burning of fossil fuels and deforestation would work. Unfortunately, climate change mitigation is not this simple, as many global leaders and scientists agree that mitigation must be economically sustainable (Lackner *et al.*, 2017: 11). This framing of the climate change issue is also embodied in the Paris Agreement and can arguably be classified as a discourse that promotes business-as-usual measures for reform rather than radical action such as advanced in the problem-solving and sustainability environmental discourses.

With this in mind, central to climate change mitigation strategies are more energy-efficient use of power, the use of renewable sources of energy and opposition to fossil fuels (Lackner *et al.*, 2017: 11). Although these measures may differ from country to country, according to their weaknesses and strengths, energy efficiency is a popular choice for most businesses and industries (Maslin, 2014: 207). This is largely because energy efficiency cuts business costs (Maslin, 2014: 207). Alternatively, renewable energy sources include the use of solar, wind, hydro, wave and tidal energy (Maslin, 2014: 210).

Adaptation, on the other hand, is necessary to ensure regions are prepared for the impacts of climate change which are already unavoidable as a result of past emissions (IPCC, 2018). In this way, adaptation is an option after mitigation that seeks to reduce the impacts of climate change, thus increasing resilience (Kazi, 2017: 56).

Climate change adaptation is important not only because it is cost-effective, but also because it seeks to address current situations rather than the future implications of climate change. This is especially important for more vulnerable populations. Firstly, adaptation is important because climate change cannot be avoided – climate change will certainly happen (Maslin, 2014: 204). The ramifications of climate change are likely to be catastrophic atmospheric events (Maslin, 2014: 204; IPCC, 2018). Secondly, emergency measures in the light of these disastrous climate change implications are far more expensive than the costs of adaptation (Maslin, 2014: 204). Adaptations that are precautionary and anticipatory are far more cost-effective and will result in less harm done to populations (Maslin, 2014: 204).

Adaptation measures may, for example, target areas such as buildings, wetlands and crops that will be affected by rising sea levels and extreme weather conditions. Adaptation to these

impacts may include retreat from affected areas (migration, relocation etc.), co-existence (switching to a different farming method, regulating building development) or defence (putting measures in place to protect affected areas) (Maslin, 2014: 204; Sinay & Carter, 2020: 3). Additionally, at the heart of adaptation is an emphasis on socio-economic sustainability. As noted in section 3.3.2, poorer populations are the most vulnerable to the impacts of climate change. It thus follows that socioeconomic upliftment is vital to help humans adapt to climate change.

Ecosystem-based adaptation (EbA) is an example of an adaptation measure that not only takes into account socio-economic upliftment, but also environmental resilience in the face of climate change. EbA makes use of nature-based solutions such as biodiversity and ecosystem services to help boost resilience in crucial habitats such as coral reefs, mangrove forests and coastal wetlands (Chevallier, 2019: 4). In this way, EbA improves resilience to climate shocks and stresses to both the environment and the communities reliant on these ecosystems. Thus, by ensuring that the quality and quantity of ecosystem services are preserved (e.g. fishing or farming), EbA supports human communities and the environment (Chevallier, 2019: 4).

While EbA represents a nature-based solution to climate change, hard engineering adaptation solutions also exist. For coastal areas that may be at risk as a result of climate change impacts, these include building barriers between the sea and the land such as offshore breakwater structures and artificial reefs (Chevallier, 2019: 4). For inland areas, these hard engineering options may also include adapting housing through the structural modification of homes, substitution of material and building techniques to reduce the impacts of extreme weather events (Sinay & Carter, 2020: 7).

Overall, it is clear that both climate change mitigation and adaptation are necessary to circumvent as many future and current effects of climate change as possible. This is especially important for vulnerable and developing countries such as South Africa.

3.7 Climate Change and South Africa

This study aimed to investigate how the phenomenon of climate change has been represented in the South African news media. It is thus appropriate and necessary to understand some of the unique challenges that climate change poses for South Africa. Although this study does not seek to determine climate change trends in South Africa, it is important to note the context of South African readers and, indeed, the context within which this study is written.

Africa as a whole has been characterised as a climate change hotspot because of its high exposure to future climate change impacts and its limited capacity for adaptation to a warming planet (Weber, Haensler, Rechid, Pfeifer, Eggert & Jacob, 2018: 643). The impacts of climate change will be especially dire for southern Africa, as the IPCC has warned that modelling projections suggest that warming in these regions would occur at double the global rate (IPCC, 2018) Bearing these factors in mind, the African continent is extremely vulnerable to the impacts of climate change.

Importantly for South Africa, like most developing nations, the direct and indirect impacts of climate change will be contingent upon the state of natural systems and extent of social vulnerabilities. Thus, the impacts of climate change on South Africa will be determined equally by how seriously natural systems will be affected by climate variability, and whether resources and opportunities are available to populations to make themselves sufficiently resilient to face these impacts.

In the light of these multifaceted challenges, several governance structures have been tasked with dealing with climate change in South Africa. Firstly, South Africa's National Committee on Climate Change (NCCC) acts as a stakeholder forum that guides the Department of Environmental Affairs (DEA) (Never, 2015: 9). Additionally, the Government Committee on Climate Change (GCCC) works to coordinate other ministries within the government according to a common position towards climate change in addition to advising the DEA on its responsibilities to the UNFCCC (Never, 2015: 9).

Evidently in support of the Paris Agreement, in 2015 South Africa submitted its intended NDC to the UNFCC (Department of Environmental Affairs, 2017: 15). This intended commitment includes a Climate Change Mitigation system and adaptation measures, in addition to the finances and investments needed to make these possible (Department of Environmental Affairs, 2017: 15).

Overall, the four major state actors involved in South Africa's domestic climate change policy include the DEA, the Department of Science and Technology, the Department of Energy, and the National Treasury (Never, 2015: 9). To add to this, important stakeholders include the largest GHG-emitting companies Sasol, a petrochemical company, and Eskom, the parastatal electricity provider (Never, 2015: 10).

3.7.1 Impacts on Natural Systems

In 2017, South Africa's Department of Environmental Affairs (DEA) released *South Africa's 2nd Annual Climate Change Report.* In it the climate change issue is acknowledged as entailing a task of "balancing the acceleration of economic growth and transformation with the sustainable use of environmental resources" (Department of Environmental Affairs, 2017: 7).

For the DEA, water is understood as the primary medium through which climate change will impact on the nation (Department of Environmental Affairs, 2017: 7). Thus, of particular concern for South Africa's natural systems is the increased incidence of droughts, especially in the western, central and northern regions. This will manifest in climate variability and extremes that will affect water quality and availability through changing rainfall patterns, more intense floods and droughts (Department of Environmental Affairs, 2017: 7).

In their latest report, the IPCC has noted that South Africa, in addition to parts of Namibia and Botswana, will most likely experience the highest increases in temperatures (IPCC 2018: 297; Maure, Pinto, Ndebele-Murisa, Muthige, Lennard, Nikulin, Dosio & Meque, 2018). Furthermore, it has been forecast that with a 1.5°C increase in the global mean temperature, there will be a significant reduction in precipitation over the Limpopo basin and the Western Cape, and an increase over central and western South Africa (IPCC, 2018: 297). Overall, these impacts will have run-on effects for agriculture and fisheries through changes in soil moisture and run-off, increased evaporation and alteration of aquatic systems (Department of Environmental Affairs, 2017: 7).

Fynbos and succulent Karoo areas have also been signalled as at-risk biomes in the light of a warming planet (IPCC, 2018). The Fynbos biome, in particular, will be threatened by the increasing incidence of fires (as a result of higher temperatures and drier winters) (IPCC, 2018: 221).

3.7.2 Impacts on Human systems

As noted in section 3.3.2, the impact that climate change has on human systems often relates to human health. These impacts are understood to affect human health by altering vital natural systems that provide food security, health, water and sanitation, shelter and settlement, and encourage migration, thus affecting the wellbeing of large portions of a given population. For South Africa, this will mostly occur through changes in water availability (Department of Environmental Affairs, 2017: 7).

Furthermore, the impact that climate change will have on the South African population's health is determined by both the increase in the incidence of disease as a result of extreme weather and rising temperature in addition to the way that these impacts interact with the socioeconomic reality of citizens (Kapwata, Gebreslasie, Mathee & Wright, 2018: 12). This is especially so for South Africa, because many households do not have the assets or capital needed to avoid or circumvent these impacts (Chersich, Wright, Venter, Rees, Scorgie & Erasmus, 2018: 8).

Chersich, Wright, Venter, Rees, Scorgie and Erasmus thus argue that climate change in the context of South Africa should be understood as a significant health issue (Chersich *et al.*, 2018: 1). In South Africa, issues of concern include the interface between HIV and climate change; the emergence of other infectious diseases in light of climate change; the impact of heat on vulnerable groups (miners, agricultural workers); climate change and mental health; and climate change and food security (Chersich *et al.*, 2018: 8). Overall, Chersich *et al.* conclude that it is far more useful to frame climate change as a health issue as opposed to simply an environmental, economic or technological conundrum (Chersich *et al.*, 2018: 8).

3.7.3 Drought in the Western Cape: "Day Zero"

As noted in the previous section, *South Africa's 2nd Annual Climate Change Report* notes that water is the primary medium through which the effects of climate change will be felt in South Africa. During the years 2015-2017 this was particularly manifest in the Western Cape, as the region suffered a severe drought and began making preparations for 'day zero' or the day that dam levels fall below 13.5% and water supply would be cut off to areas of the city of Cape Town, and water would be rationed out at communal distribution points (Taing, Chang, Pan & Armitage, 2019: 531).

From a climate science perspective, this drought occurred as a result of below-average rainfall for three consecutive years – an extremely rare anomaly (Otto, Wolski, Lehner, Tebaldi, Van Oldenborgh, Hogesteeger, Singh, Holden, Fučkar, Odoulami & New, 2018: 1). Overall, this drought affected water availability for the City of Cape Town by impacting on the six large reservoirs that provide fresh water to the city (Otto *et al.*, 2018: 2).

Because of low run-off from source catchments, these vital reservoirs failed to collect sufficient water reserves and thus risked falling short of providing water for the approximately 3.7 million Cape Town residents and the irrigated agriculture in the Western Cape. This diminished run-off, in particular, can largely be attributed to higher than normal temperatures, lower relative humidity and thus increased evaporation (Otto *et al.*, 2018: 4).

Because of the region's reliance on these rain-fed dams, in addition to the growing city and agricultural sector, in August 2017 extreme water restriction measures were put in place by the City of Cape Town's municipal government in an attempt to stave off 'day zero' (Otto *et al.*, 2018: 4). These measures were largely focused on urging citizens to cut down on their water consumption with restrictions tailored to different 'levels' (Otto *et al.*, 2018: 4). At Level 4, these restrictions included the overall-consumption of 100 litres of water per person per day, the prohibition of any irrigation using drinking water, and a ban on recreational water use (Newkirk, 2018). As the drought persisted and dam levels remained low, these restrictions tightened, and advice from government included taking shorter showers, reusing shower water to flush toilets, and further reducing the number of litres-per-day limit (Newkirk, 2018).

Not only did the drought and the response measures restrict citizen's access to water, but the water crisis also had widespread economic and social impacts, particularly for the agricultural and tourism sectors (Parks, Mclaren, Toumi & Rivett, 2019: 1). As discussed in previous sections, water availability and health are intricately interlinked. Thus, not only did the drought have an impact on health through vector- and air-borne or dust-related diseases, water-related diseases and mental health effects, but also by putting a strain on healthcare provisions and structures (Parks *et al.*, 2019: 10). For the agriculture and tourism sectors, on the other hand, estimates suggest a 20.4% decrease in the production of major crops and a significant decline in the number of visitors to Cape Town during 2017 (Parks *et al.*, 2019: 10).

Droughts are an especially complicated phenomenon and thus scientists struggle to pinpoint their cause. Nonetheless, Otto *et al.* have stated that climate change most certainly worked as a risk multiplier in the years leading up to 'day zero' panic in the Western Cape (Otto *et al.*, 2018: 9). They maintain that climate change most likely doubled the likelihood of prolonged drought and that this trend will certainly continue at a similar rate in the future (Otto *et al.*, 2018: 9).

3.8 Conclusion

In recognising that 'popular' media plays an influential role in the material management of the climate change issue, this study emphasises the need to understand how the climate change issue has been presented to civil society through online news media. This being said, a study examining how this issue is being framed in the media would not be possible without a foundational understanding of the context of climate change. Thus, this chapter aimed to provide an objective 'baseline' of comparison before proceeding with the study.

Through a brief discussion of the science related to the greenhouse effect and historical climate change, a foundation was set for understanding the implications of these scientific phenomena in the light of human or interference or anthropogenic impacts. Additionally, through a discussion on how threats to these natural systems affected human systems, it was clear that the impact of climate change on human livelihood lies essentially in the threat it poses for human health.

The complexity of climate change, however, is not limited to its interconnected impacts on human and natural systems. Section 3.5 illustrated this by highlighting why climate change is such a complex issue to manage as a result of factors such as systematic and cumulative global changes, time scales, tipping points and issues pertaining to equity and climate justice. Overall, it is clear that climate change demands monumental and concerted global efforts in response and thus Section 3.6 discussed the structure of global climate governance, while Section 3.7 laid out climate change mitigation and adaptation strategies that these governance structures seek to put in place. This chapter concluded with an overview of the unique challenges that climate change poses for South Africa – the country of focus of this study.

4 Findings and Analysis: How did South African online news media construct the climate change issue?

4.1 Introduction

Critical geopolitics argues that it is vital to ask "how and why we have come to think of the world in a certain way" (Dittmer & Bos, 2019: 11). Proponents maintain that examining the language used in statements may reveal biases and agendas (Flint, 2017: 25). Overall, the importance of questioning any claims presented as objective truths is emphasised. The study of popular geopolitics takes this argument a step further, showing that these 'claims', especially when they are reiterated in popular media such as online news media, ultimately construct 'realities' that build popular consensus, norms and boundaries for engagement (Wang, 2013: 23). These theoretical points of departure are especially important to bear in mind when studying the climate change issue, because 'climate' is a phenomenon that cannot be experienced directly. Overall, the world's understanding of the climate change issue is constructed by actors such as journalists, policy makers, international organisations and heads of state.

In this chapter the researcher aims to reveal how South African online news media constructed the climate change issue during December 2019, the month of the COP25 conference. In other words, this chapter bears in mind the main notions of critical geopolitics and the considerations of popular geopolitics by making use of 'framing' as the research tool to understand how climate change was constructed in South African online news media. The chapter will begin by explaining which frames the researcher chose to code for. After that, the frame analysis process will be set out, with discussions and examples of both the primary and secondary cycles of the coding process. Finally, the researcher will embark on a detailed analysis of the findings of the frame analysis, focusing on how often the selected frames occurred and in what context they appeared.

4.2 Frames

As discussed in previous chapters, framing theory shares many similarities with the study of both critical and popular geopolitics and is, therefore, suitable for this study. The act of 'framing' in this sense is detected through the repetition and reinforcement of words and images, thus making certain understandings of an issue more prominent than others (Entman, 1991: 7). In this study, the researcher made use of deductive framing methods to identify the chosen frames within the data sample.

The frames chosen for this study are the *disaster* frame and the *economic* frame. Both of these frames in this study have been adapted from O'Neill *et al.* (2015) and supplemented with reference to Dryzek (2013). Thus, the discussion of these frames is the researcher's interpretation and they have been modified for content analysis and qualitative coding.

4.2.1 *Disaster* Frame

Central to the *disaster* frame is its construction of the climate change issue as something that warrants being fearful of. Two elements make up this frame: its focus on the impacts of climate change and their nature, and the use of frightening language.

When this frame is present in news articles, the impacts of climate change are often presented as long lists of severe impacts, predicted worrying scientific findings, or a challenge that is overwhelmingly large, especially for the most vulnerable in society. This may include long lists of impacts (sea-level rise, the decline in coral reefs, extreme weather events, floods, droughts, forced migration and food security under threat), scientific 'warnings' or mounting new scientific findings that imply immense risks, challenges, disruptions and overshoot.

The second key element of this frame is the use of frightening language. This may include words that trigger apocalyptic imagery such as 'existential threat,' 'sacrificed planet' and a 'future ravaged by global warming'. This frightening language may also emphasise that climate change warrants a sense of urgency and that it is an emergency requiring a crisis response.

4.2.2 *Economic* Frame

An important characteristic of the *economic* frame is discussions focused on economic growth, prosperity, costs and markets. This frame thus works to characterise the climate change issue in terms of the monetary cost that may come along with climate change-related impacts or international treaties and actions, such as the Paris Agreement.

For this study, the *economic* frame is broken down into *economic (1)* and *economic (2)* dimensions. The *economic (1)* frame discusses the financial cost of climate change action as something necessary and possible, while the *economic (2)* frame uses the economic cost of climate change as a justification for not taking any action. Although elements of both frames include discussions of economic prosperity, monetary costs, low carbon economies and market-based mechanisms. whether the *economic (1)* or *economic (2)* frame is present is determined by the evidence of 'support' or of 'criticism.'

For instance, if an article suggests that economic action is possible and presents an opportunity, or that progress is being made, or there have been calls for climate action, there is an indication of 'support' and thus the *economic (1)* frame is present. When climate change is discussed with reference to how lucrative the fossil fuel industry is, or climate scepticism or how climate action is too expensive given other priorities, the *economic (2)* frame is most likely present.

Overall, the *disaster* frame constructs the climate change issue in terms of its impacts and makes use of frightening language, while *economic (1)* and *economic (2)* frames refer to climate change in terms of support for or criticism of the cost of climate action.

4.3 Coding

For this study, the process of conducting a frame analysis included two cycles of qualitative coding. In line with the deductive nature of this study, the researcher commenced the frame analysis by interpreting the chosen frames (see Section 4.2) and then breaking them down for coding. For this purpose, the researcher constructed criteria for the presence or absence of the chosen frames.

This process involved breaking down each frame into its most basic elements, to create 'frame indicators.' After that, the researcher coded articles with 'descriptive codes' (1st-level codes) and then organised these into focused categories (2nd-level codes). Finally, the presence or absence of a frame was recorded when the combination of 2nd-level codes in a given article met the 'frame indicator' criteria. This took the shape of Table 5 below.

To aid in describing the primary and secondary cycles of coding, this section will conceptualise these 'descriptive codes' and provide some detailed examples of how the researcher conducted the coding process.

Descriptive Codes (1st-level codes)	**Focused Categories (2nd-level codes)**	**Criteria for Frame (Frame Indicator)**	**Frame**
Emergency Apocalyptic	Frightening language	frightening language + listing impacts or frightening language + scale of challenges	<u>Disaster</u> *Predicted impacts are dire. Impacts are numerous, discussed in detail. Impacts will get worse and we are not prepared*
Numerous impacts Bleak scientific findings Vulnerable	Listing impacts		
Monetary cost Overshoot Risk multiplier	Scale of challenges		
Conditional support Possible Opportunity Calls for urgency	Support	<u>Economic (1)</u> Divestment + Support or Economy + support or Economy + Divestment + Support <u>Economic (2)</u> Divestment + Critical or Economy + Critical or Divestment + Economy + Critical	<u>Economic</u> *Discusses growth, prosperity, investments, markets. Provides economic costs.*
Priorities Lucrative fossil fuel Reluctance Scepticism	Critical		
Low-Carbon Economy Market-based mechanisms	Divestment		
Employment Economic prosperity Monetary cost Assets	Economic		

Table 5: The Coding Process (table compiled by the author for this study)

4.3.1 Description of Primary and Secondary Cycle coding

The primary cycle of coding began after the sample of online news article had been retrieved and the researcher had conducted purposive sampling (removing duplicates and false positives). In this primary cycle of coding, descriptive codes (1st-level codes) were assigned to sentences, phrases and metaphors that stood out for the researcher.

The researcher conceptualised the criteria for the presence of these descriptive codes as outlined below.

Emergency: Sentences including words such as 'crisis' or 'emergency' when describing the climate change issue. This may include phrases that denote the need for emergency action or signal the existence or need for such action, like 'alarm bells ringing'.

Apocalyptic: Sentences and phrases that elicit fear, or images of doom and peril. This may include the use of words such as 'catastrophe' and 'existential threat' and mention of perilous situations such as suffering, dying, collapse, chaos and mass extinction. Frightening imagery and metaphors are also common, such as the inclusion of imagery of the future of humanity as ravaged by disaster, resulting in an uninhabitable planet.

Numerous impacts: This code is present when the article lists numerous climate change impacts such as temperature rises, migration, extreme weather, flooding, droughts and storms.

Bleak scientific findings: Accounts of scientific findings, 'mounting scientific evidence' or 'bombshell' reports. Organisations often quoted include the World Meteorological Organisation, the IPCC and the United Nations.

Vulnerable: Phrases that describe victims of climate change impacts. Often this is described in terms of vulnerable poor communities in the Global South or the developing world being the hardest hit.

Monetary cost: This code describes monetary costs of climate change, including discussion of funding, costly investment, financing, financial aid and financial support.

Overshoot: This refers to phrases that describe climate change or its impacts as exceeding or soaring above current limits, reaching tipping points and passing points of no return.

Risk multiplier: This code is present when an article characterises climate change as an element that compounds, accelerates, turbocharges or triggers further climate-related impacts or repercussions.

Conditional support: This code describes notions of support for some actions but not for others, such as increasing funding for mitigation but not increasing reduction targets.

Possible: This code describes acknowledgement that solutions to the climate change issue do exist and that they can be carried out without causing harm to, for example, the job market.

Opportunity: Here, climate action is characterised as a favourable opportunity for cheaper electricity, favourable investment and economic growth.

Calls for: This code is used when an article mentions calls for climate action or criticism over a lack of action. This is often present when mentioning climate protests and individuals demanding climate action.

Urgency: This code is present in sentences and phrases to communicate the seriousness and limited time left to act against climate change. This includes comments such as 'the planet will become uninhabitable sooner than anticipated,' being on the 'brink of missing the opportunity,' 'a race against time,' and an overall emphasis on the importance of acting quickly.

Priorities: Here, climate change action is communicated as a secondary priority. Often, this is because of financial constraints or more pressing issues such as civil unrest.

Lucrative fossil fuel: This code describes the mention of the fossil fuel industry (such as coal mining) as financially successful and necessary.

Reluctance: This code is present when sentences and phrases express reluctance to enhance or begin climate action. This may be described as a 'push back against increased action' or 'resisting pressure to address climate change'.

Scepticism: This code signals the presence of scepticism about the cause of climate change or about the link between extreme weather events and climate change impacts, despite scientific evidence in an article.

Low-carbon economy: This code describes the discussion of renewable energy, energy efficiency, a retreat from coal, support for a green economy, working towards carbon neutrality, net-zero carbon emissions, weaning off fossil fuels and retooling the economy towards renewable energy. Overall, it marks out discussions regarding the transition from fossil fuels to more sustainable energy sources such as solar and wind power.

Market-based mechanisms: This code is present when an article references market-based climate action mechanisms such as the Green Climate Fund, trading emissions, carbon credits, carbon trading, carbon markets, carbon tax and sun tax.

Employment: This code is used when the creation or loss of jobs, reskilling green jobs, labour markets and minimum wage are discussed in relation to climate change.

Economic prosperity: This code is used when economic growth, restructuring the global economy, investors, economies of scale, responsible investment, GDP, economic losses, growth opportunity, economic development, operating costs and insurance are discussed in relation to climate change or climate change impacts.

When no new information fits the above descriptive codes, the researcher considered the primary cycle of coding to be complete.

Next, in the second cycle of coding, the researcher organised these descriptive codes into focused categories (2nd-level codes) and determined whether the combination of 2nd-level codes in a given news article indicated the presence of the *disaster, economic (1)* or *economic (2)* frame (see Table 5). An in-depth description of how the researcher assigned descriptive and 2nd-level codes will be provided in the next section.

4.3.2 Examples of Coding

The news articles labelled News24 13, News24 14, News24 34, SABC 8, SABC14 and eNCA 22 will be used to demonstrate how this coding process took place. These particular articles were chosen to exemplify how the process of coding for articles that were determined as exhibiting the *disaster, economic (1) & disaster, economic (1), economic (2), economic (1) & economic (2)* frames occurred.[20]

4.3.2.1 News24 13

This article is titled *'Cleaner and cheaper': Sunny Spain is banking on renewable energy.* It discusses steps taken by the Spanish government to move the country towards a low-carbon economy. Additionally, the article focuses on projects that have been launched to cut emissions such as renewable energy alternatives like solar and wind power.

[20] These articles can be viewed in full in Appendix A

Descriptive coding began with the phrase, "Spain welcomes the opportunity to spotlight its fast-tracked shift to renewable sources of energy", which the researcher coded as 'low-carbon economy', while mention of "investors", "investments", "projects that risk becoming stranded assets" and "economies of scale" were coded as 'economic prosperity' (Aljazeera, 2019a). This article also mentioned the money needed to transition to renewable energy, which was coded as 'monetary costs.' Finally, the researcher identified the 'market-based mechanisms' code in phrases such as "Madrid is pushing citizens to become prosumers (producer consumers), a change enabled by the recent repeal of the 'sun tax'…" (Aljazeera, 2019a). Overall, these descriptive codes fell into the focused categories 'economy' and 'divestment', suggesting the presence of one of the *economic* frames.

In addition to the above codes, the researcher also coded several descriptive codes that fell under the category 'support'. These included phrases such as "the technology to make renewable electricity very cheap" and "producing with sun or wind in Spain is half the cost we have on the wholesale [electricity] market" (Aljazeera, 2019a). Both phrases suggest that climate change action (such as transitioning to renewable energy) represents an opportunity and they were therefore coded as 'opportunity'. Finally, when discussing energy efficiency, the article quoted the Spanish secretary of state energy saying "We must make this transition. There is no other way," suggesting support for progress towards a low-carbon economy (Aljazeera, 2019a). This quotation was thus coded as 'progress'.

Overall, the 2nd-level codes present in this article included 'economy,' 'divestment' and 'support,' thus indicating the presence of the *economic (1)* frame.

4.3.2.2 News24 14

This article is titled *UN talks struggle to stave off climate chaos.* It discusses the state of climate negotiations at COP25 in the light of increasingly prevalent climate change impacts and scientific evidence. Additionally, it reports on some proceedings of COP25 including shifting alliances among Parties and restructuring the global economy. Overall, this article's focus was on the proceedings of COP25; however, it was underpinned by a sense of fear and urgency.

The article started off describing the best-case outcomes for UN climate negotiations as falling short of what is necessary to avoid "a future ravaged by global warming" and rising sea levels as "an existential threat" (AFP, 2019a). The researcher coded these views as 'apocalyptic' as the phrasing worked to elicit fear and a sense of doom about the future of the planet. Next, the article proceeded to describe recent climate-related impacts as follows, "…COP25 summit

comes on the heels of climate-related disasters across the planet, including unprecedented cyclones, deadly droughts and record-setting heatwaves" (AFP, 2019a). This was coded as both 'apocalyptic' and 'numerous impacts' as it both intensified the fear of climate impacts through words like "unprecedented", "deadly" and "record-setting" in addition to listing several climate-related impacts. The article added that "scientists have amassed a mountain of evidence pointing to even more dire impacts on the near horizon", which was coded as 'bleak science' (AFP, 2019a). So far, these descriptive codes fall under the 2nd-level codes 'frightening language' and 'listing impacts', thus indicating the presence of the *disaster* frame.

This article went on to recount the calls for action against climate change, reporting that "millions of youth activists are holding weekly strikes demanding government action" – this was coded as 'calls for' as this phrase was characterised as indicating the need for something vital and necessary to save the planet (AFP, 2019a). To meet these calls for action, attention was drawn to "the trillions needed to live in a climate-addled world" (AFP, 2019a). This was coded as 'monetary cost'. Lastly, the article ended by stating that to limit warming to 1.5°C, there was a requirement for "nothing less than a restructuring of the global economy", which was coded as 'economic prosperity' (AFP, 2019a). Overall, these descriptive codes fell under the 2nd-level codes, 'support' and 'economy', situating this article within both the *disaster* frame and *economic (1)* frame.[21]

4.3.2.3 News24 34

News24 34 is titled, *Climate change, the year the world woke up to the emergency*. This article reflects on a year when climate change was brought into the mainstream by activists such as Greta Thunberg. The article seems to accept the sense of urgency that climate protests have elicited by referring back to the 'bombshell' report published by the IPCC in 2018. Overall, this article elicits a sense of urgency in the light of the "climate emergency".

The researcher noted that this article characterised climate change as a catastrophe on two occasions, stating that if the planet continued to heat as a result of climate change, "the difference between 1.5°C and 2°C could be catastrophic" and that "younger generations have woken up to the threat of climate catastrophe, industry shows little signs of sharing their

[21] The descriptive code 'monetary cost' falls under the category 'scale of challenges' and 'economy.' In this instance, the requirements for the presence of the *disaster* frame had already been met, thus this code was discussed in relation to the *economic (1)* frame. Nonetheless, the researcher considers the presence of the 'monetary cost' code as fulfilling the requirements of both the *disaster* and *economic (1)* and *economic (2)* frames at the same time.

urgency" (AFP, 2019b). The former was coded as 'apocalyptic', while the latter was coded as 'apocalyptic' and 'urgency.' Similarly, the article emphasized the urgency associated with climate change, referring to this issue as the "climate emergency" on two occasions – this was accordingly coded as 'emergency'. These descriptive codes form part of the category 'frightening language' by effectively eliciting images of doom and fear through the reiteration of words such as 'catastrophe', 'threat', 'urgency' and 'emergency'.

Other descriptive codes identified in this article include 'calls for' and 'numerous impacts'. The researcher coded the quote "Schoolchildren skipping class to strike and protest – spurred on by Swedish wunderkind Greta Thunberg – bringing city centres to a standstill and sounding warnings to leaders across the world" as 'calls for' (AFP, 2019b). The 'numerous impacts' code, on the other hand, was exemplified by phrases such as "extreme weather events … struck seemingly everywhere this year" and "Cyclone Idai in Mozambique, typhoon Hagibis in Japan, a deadly, record-breaking heatwave across much of Europe, wildfires in California and eastern Australia, floods in Venice ... the list goes on" (AFP, 2019b).

While the 'calls for' code did not fulfil the requirements of any frame, the combination of 'frightening language' and 'listing impacts' (numerous impacts) indicated the presence of the *disaster* frame.

4.3.2.4 SABC 8

SABC8 is titled *Australian PM defends climate policies as cooler weather helps firefighters.* This article documents the Australian fires and the actions of the Australian Prime Minister, Scott Morrison. The article reports on how the Prime Minister has been criticised for holidaying with his family in Hawaii while "the wildfire crisis in his home state deepened" (Reuters, 2019a). SABC8 mentions climate change in relation to the Prime Minister's conservative Liberal-National coalition's climate policies and his hesitation to link the Australian bushfires to climate change. Still, the article goes on to mention the criticism Australia faced at COP25 earlier that month regarding the use of old carbon credits for future emission targets in addition to its position as one of the world's largest carbon emitters per capita because of its reliance on coal-fired power plants.

Overall, this article is both critical of the state of Australia's climate action policies as well as mentioning scepticism about the link between the bushfires and climate change. This sense of scepticism was expressed in the phrases "Morrison said there was no argument that there is a link between climate change and weather events around the world," followed by "But I'm sure

people would equally acknowledge the direct connection to any single fire event is not a credible suggestion to make that link" (Reuters, 2019a). The researcher coded this as 'scepticism' as scientific reports have confirmed that anthropogenic climate change drivers did play a role in the Australian bushfires and that many extreme weather events around the world have been attributed to climate change (IPCC, 2018; van Oldenborgh *et al.*, 2020).

Criticism of Australia's insufficient climate change action so far, on the other hand, were found in phrases such as "Australia drew criticism at a UN climate summit in Madrid for its climate change policy of using old carbon credits towards future emissions targets" and "critics accuse Morrison of paying lip service to that commitment" (Reuters, 2019a). These phrases were coded as 'calls for' as they criticised a lack of climate action. Furthermore, the crux of this criticism was based partly on Australia's use of "carbon credits", supposedly unethically – this notion was thus coded as 'market-based mechanism'.

Overall, this article laid out both scepticism about climate change and criticism of a lack of sufficient climate action. Therefore, because the 2nd-level codes 'criticism', 'support' and 'divestment' were present, the researcher recorded the presence of the *economic (1)* and *economic (2)* frames.

4.3.2.5 SABC14

SABC14 is titled *US, Australia, Saudi Arabia pushing back on enhancing climate action.* This article reports on the deadlocked negotiations at COP25 between certain developed countries and developing countries in the Global South. This was after some developed nations had opted not to enhance their contributions and funding for climate action.

This article was coded with the descriptive codes 'reluctance' and 'monetary'. The article describes the pushback by countries such as the US, Australia and Saudi Arabia in phrases such as "pushing back on enhancing climate action ambitions by 2020" and "they're also against increased funding to fight climate change" (Bolani, 2019a). These phrases were assigned the code 'reluctance' as they expressed an unwillingness to enhance action against climate change.

Central to the unwillingness to enhance climate action was the issue of funding and finance. Phrases such as "finance support for the Global South" and "increased funding to fight climate change" were thus coded as 'monetary cost' (Bolani, 2019a).

Overall, the descriptive codes in this article fell under the categories of 'critical' and 'economy', therefore signalling the presence of the *economic (2)* frame.

4.3.2.6 eNCA22

This article is titled *November 2019 was joint hottest on record: data*, is an example of an instance where the researcher did not record the presence of any of the chosen frames. The article discusses new satellite data that suggest that the 2010s had been the hottest decade in history.

The researcher used only one descriptive code in this article, coding 'scientific findings' for phrases that described examples around the world of rising surface temperatures such as "satellite data showed on Wednesday, marking six consecutive months where the world either broke or equalled record temperatures", " The United Nations … said that 2019 is on course to be one of the three hottest years on record" and "The World Meteorological Organization … virtually certain that 2010s have been the hottest decade in history" (AFP, 2019c).

Although this descriptive code falls under the category 'listing impacts', there are no other codes present to qualify it as being framed as *disaster, economic (1)* or *economic (2).* eNCA22 was hence recorded as 'none.'

The above examples represent a detailed snapshot of how the researcher conducted primary and secondary cycle coding, typifying how coding resulted in each frame and frame combination present in the given data. This process was repeated for all 58 articles. A summary of how all 58 articles were coded is laid out in Table 6.

				Primary Cycle Coding	Secondary Cycle Coding			
	Website	**Date**	**Title**	**Descriptive Codes (1st-Level Codes)**	**Focused Categories (2nd-Level Codes)**	**Criteria fulfilled (Frame indicator)**	**Frame**	**Categories for Analysis**
1	News24 2	31-Dec-19	Thousands trapped on Australia beaches encircled by fire	Reluctance + Lucrative FF	Critical	None	No Frame	Australia fire
2	News24 3	31-Dec-19	Trump, Syria and citizen action: the volatile cocktail of the 2010s	Apocalyptic + Calls for + Economic	Frightening Language + Support + Economy	Support + Economy	Economic (1)	Among other issues
3	News24 4	30-Dec-19	Greta Thunberg's father says activism makes her happy, helped with her Asperger's	Apocalyptic	Frightening Language	None	No Frame	Greta Thunberg
4	News24 5	30-Dec-19	Tourists, firefighters flee as new heatwave fans Australia blazes	Reluctance + Calls for + Lucrative FF	Critical +Support	None	No Frame	Australia fire
5	News24 9	19-Dec-19	Putin says 'nobody knows' causes of global climate change	Progress + Scepticism	Support + Critical	None	No Frame	Putin
6	News24 10	19-Dec-19	State of emergency declared as bushfires rage in Australia	Bleak Science	Listing Impacts	None	No Frame	Australia fire
7	News24 11	19-Dec-19	First ‘plastic’ road officially opened	Employment	Economy	None	No Frame	Innovation
8	News24 13	16-Dec-19	'Cleaner and cheaper': Sunny Spain is banking on renewable energy	Monetary Cost + Opportunity + Progress + Low-carbon Economy + Market-based + Econ Pros	Economy + Support + Divestment	Economy / Divestment + Support	Economic (1)	COP25/ Innovation
9	News24 14	13-Dec-19	UN talks struggle to stave off climate chaos	Apocalyptic + Numerous Impacts + Bleak Science + Monetary Cost + Calls for + Econ Pros	Frightening Language + Listing Impacts + Scale of Challenges + Support + Economy	Frightening Language + Listing Impacts/ Scale of Challenges & Economy + Support	Disaster and Economic (1)	COP25
10	News24 21	11-Dec-19	ANALYSIS | Creecy talks the talk, but will the govt walk the walk?	Emergency + Apocalyptic + Monetary Cost + Possible + Progress + Calls for + Low Carbon Econ + Employment + Econ Pros	Frightening Language + Scale of Challenges + Support + Divestment + Economy	Frightening Language + Scale of Challenges &	Disaster and Economic (1)	SA

						Economy/Divestment + Support		
11	News2424	10-Dec-19	Creecy commits to enhancing SA's climate change contributions at COP25	Progress + Market-based	Support + Divestment	Divestment +Support	Economic (1)	COP25/ SA
12	News2425	10-Dec-19	Australians abandon homes as soaring heat, winds threaten more bush fires	Calls for + Lucrative FF + Low Carbon Econ	Support + Divestment	Divestment +Support	Economic (1)	Australia fire
13	News2426	09-Dec-19	Africa caught between climate and growth: top diplomat	Vulnerable + Priorities + Monetary Cost + Employment	Listing Impacts + Critical + Economy	Economy + Critical	Economic (2)	COP25/ Africa
14	News2427	09-Dec-19	Over 9 million facing food shortages in African Sahel: officials	Numerous Impacts + Vulnerable	Listing Impacts	None	No Frame	Food Insecurity
15	News2428	08-Dec-19	Climate crisis gatecrashes OPEC gathering	Emergency + Apocalyptic + Calls for + Scepticism	Frightening Language + Support + Critical	None	No Frame	COP25/ Oil companies
16	News2429	07-Dec-19	Floods kill 12 people in western Uganda	Bleak Science	Listing Impacts	None	No Frame	Flood
17	News2430	07-Dec-19	Fossil-fuel groups 'destroying' climate talks: NGOs	None	None	None	No Frame	COP25/ Oil companies
18	News2431	06-Dec-19	From protests to Paris - the year that was 2019	Calls for	Support	None	No Frame	Among other issues
19	News2432	05-Dec-19	Sydney smoke crisis 'longest on record', authorities say	Bleak Science	Listing Impacts	None	No Frame	Australia fire
20	News2433	05-Dec-19	Clem Sunter I The world and South Africa in the 2020s: The latest flags, scenarios and probabilities	Apocalyptic + Numerous Impacts + Urgency	Frightening Language + Listing Impacts + Support	Frightening Language + Listing Impacts	Disaster	Among other issues
21	News2434	04-Dec-19	Climate change: the year the world woke up to the emergency	Emergency + Urgency + Apocalyptic + Numerous Impacts + Bleak Science + Calls for	Frightening Language + Support + Listing Impacts	Frightening Language + Listing Impacts	Disaster	Greta Thunberg/ Climate Protests
22	News2435	04-Dec-19	SA needs to address role in climate change	Numerous Impacts + Low Carbon Economy + Market-based	Listing Impacts + Divestment		No Frame	SA

23	News24 36	02-Dec-19	UN chief warns of 'point of no return' on climate change	Bleak Science + Overshoot + Market-based	Listing Impacts + Scale of Challenges + Divestment	None	No Frame	COP25
24	News24 38	07-Dec-19	Australia braces for heatwave as more than 100 fires burn	Bleak Science	Listing Impacts	None	No Frame	Australia fire
25	News24 39	06-Dec-19	'Mega fire' forms north of Sydney	Bleak Science	Listing Impacts	None	No Frame	Australia fire
26	SABC 2	14-Dec-19	African ministers stick to their guns on climate change	Monetary Cost + Conditional Supp + Progress	Economy + Support	Economy + Support	Economic (1)	COP25/ Africa
27	SABC 3	09-Dec-19	Youth environmentalists to speak on climate change at COP25	Emergency	Frightening Language		No Frame	COP25
28	SABC 4	09-Dec-19	Technological and climate change could trigger new divergence in society	Apocalyptic + Risk Multiplier	Frightening Language + Scale of Challenges	Frightening Language + Scale of Challenges	Disaster	Innovation
29	SABC 5	08-Dec-19	African ministers need to speak in one voice on climate change: Creecy	Urgency + Monetary Cost + Possible + Calls for + Low Carbon Econ + Employment + Market-based	Support + Economy + Divestment	Economy/ Divestment + Support	Economic (1)	COP25/Africa
30	SABC 6	07-Dec-19	COP25 Climate Change Conference focuses on Africa	Urgency + Apocalyptic + Numerous Impacts + Bleak Science + Monetary Cost + Progress + Market-based + Econ Pros	Frightening Language + Listing Impacts + Scale of Challenges + Support + Economy	Frightening Language + Listing Impacts/ Scale of Challenges & Economy + Support	Disaster and Economic (1)	COP25/Africa
31	SABC 7	02-Dec-19	United Climate Change Conference, COP 25 kicks off on Monday	Low-carb Econ	Divestment	None	No Frame	COP25
32	SABC 8	22-Dec-19	Australian PM defends climate policies as cooler weather helps firefighters	Calls for + Scepticism + Market-based	Support + Critical + Divestment	Divestment + Support Divestment + Critical	Economic (1) and Economic (2)	Australia fire
33	SABC 9	15-Dec-19	Major states snub calls for climate action as UN summit wraps up	Emergency + Urgency + Numerous Impacts + Overshoot + Monetary Cost + Possible + Calls for + Low Carb Econ + Market-based	Frightening Language + Scale of Challenges + Economy + Support + Divestment	Frightening Language + Scale of Challenges	Disaster and Economic (1)	COP25

						& Economy/Divestment + Support		
34	SABC 10	15-Dec-19	Negotiators work through the night to salvage climate summit	Urgency + Apocalyptic + Vulnerable + Calls for	Frightening Language + Support + Listing Impacts	Frightening Language + Listing Impacts	Disaster	COP25
35	SABC 11	14-Dec-19	EU leads call for stronger climate ambition	Progress	Support	None	No Frame	COP25/EU
36	SABC 12	13-Dec-19	Green Climate Fund stepping up on 'loss and damage', head says	Apocalyptic + Numerous Impacts + Vulnerable + Monetary Cost + Progress + Market-based + Econ Pros	Frightening Language + Listing Impacts + Scale of Challenges + Support + Divestment + Economy	Frightening Language + Listing Impacts/ Scale of Challenges & Divestment/ Economy + Support	Disaster and Economic (1)	COP25/ Funding
37	SABC 13	12-Dec-19	Conference hears that climate action can create millions of jobs	Monetary Cost + Opportunity + Calls for + Low-carb Econ + Employment + Econ Pros	Scale of Challenges + Support + Divestment + Economy	Divestment/ Economy + Support	Economic (1)	COP25/ Jobs
38	SABC 14	12-Dec-19	US, Australia, Saudi Arabia pushing back on enhancing climate action	Reluctance + Monetary Cost	Critical + Economy +Scale of Challenges	Economy Critical +	Economic (2)	COP25
39	SABC 15	11-Dec-19	Teenage climate activist Greta Thunberg named Time magazine's Person of the Year	Emergency + Urgency + Apocalyptic + Numerous Impacts + Calls for + Econ Pros	Frightening Language + Listing Impacts + Support + Economy	Frightening Language + Listing Impacts & Economy + Support	Disaster and Economic (1)	Greta Thunberg
40	SABC 16	08-Dec-19	Climate crisis could reverse progress in achieving gender equality	Emergency + Urgency + Numerous Impacts + Vulnerable + Employment	Frightening Language + Support + Listing Impacts + Economy	Frightening Language + Listing Impacts &	Disaster and Economic (1)	Gender

						Economy + Support		
41	SABC 17	03-Dec-19	Climate activist Greta Thunberg reaches Lisbon on way to Madrid summit	Emergency + Urgency + Bleak Science	Frightening Language + Support + Listing Impacts	Frightening Language + Listing Impacts	Disaster	Greta Thunberg/ COP25
42	SABC 18	14-Dec-19	COP25 talks reach standstill on key issues	Monetary Cost + Calls for + Market-based	Scale of Challenges/ Economy + Support + Divestment	Economy/ Divestment + Support	Economic (1)	COP25
43	SABC 19	01-Dec-19	War against nature must stop: UN Chief	Numerous Impacts + Calls for	Listing Impacts + Support	None	No Frame	COP25
44	SABC 26	03-Dec-19	Rising seas threaten early end for sinking village in Philippines	Urgency + Apocalyptic + Numerous Impacts + Vulnerable	Frightening Language + Support + Listing Impacts	Frightening Language + Listing Impacts	Disaster	Sea-Levels
45	SABC 28	02-Dec-19	South Africa is a severely water stressed country: Ramaphosa	Risk Multiplier	Scale of Challenges	None	No Frame	SA
46	SABC 29	27-Dec-19	Recession, robots and rockets: another roaring 20s for world markets?	Emergency + Numerous Impacts + Monetary Cost + Opportunity	Frightening Language + Listing Impacts + Scale of Challenges + Economy + Support	Frightening Language + Listing Impacts/ Scale of Challenges & Economy + Support	Disaster and Economic (1)	Innovation
47	eNCA 1	17-Dec-19	Coal demand to remain stable amid climate concerns: IEA	Emergency + Calls for + Econ Pros	Frightening Language + Support + Economy	Economy + Support	Economic (1)	Fossil Fuel Companies
48	eNCA 2	08-Dec-19	Santa Claus dives into hot climate issue in Paris aquarium	Numerous Impacts	Listing Impacts	None	No Frame	Other
49	eNCA 6	08-Dec-19	Atlantic haven is a test bed for planet's sickly oceans	Apocalyptic	Frightening Language	None	No Frame	Research
50	eNCA 7	30-Dec-19	Bushfires reach Melbourne as heatwave fans Australia blazes	Risk Multiplier + Reluctance + Calls for + Lucrative FF	Scale of Challenges + Critical + Support + Divestment	Divestment + Support	Economic (1) and Economic (2)	Australia fire

						& Divestment + Support		
51	eNCA 8	31-Dec-19	2019 was hottest year on record for Russia	Apocalyptic + Scepticism	Frightening Language + Critical	None	No Frame	Putin
52	eNCA 12	26-Dec-19	2019: a look back at a year of turmoil	Numerous Impacts + Calls for	Listing Impacts + Support	None	No Frame	Among other issues
53	eNCA 13	03-Dec-19	2010s hottest decade in history, UN says as emissions rise again	Urgency + Apocalyptic + Numerous Impacts + Bleak Science + Monetary Cost + Calls for + Low-carb Econ	Frightening Language + Scale of Challenges + Listing Impacts + Economy + Support + Divestment	Frightening Language + Scale of Challenge/ Listing Impacts & Economy/Divestment + Support	Disaster and Economic (1)	Research
54	eNCA 14	20-Dec-19	Australian firefighters die as flames circle Sydney	Calls for	Support	None	No Frame	Australia fire
55	eNCA 18	08-Dec-19	Sand cars replace sand castles at Miami art festival	Emergency	Frightening Language	None	No Frame	Other
56	eNCA 21	07-Dec-19	Insurers begin blacklisting coal	Progress + Low-carb Econ + Econ Pros	Support + Divestment + Economy	Economy/Divestment + Support	Economic (1)	Fossil Fuel Companies
57	eNCA 22	04-Dec-19	November 2019 was joint hottest on record: data	Bleak Science	Listing Impacts	None	No Frame	Research
58	eNCA 25	18-Dec-19	NGOs launch legal action against France over climate	Apocalyptic + Bleak Science + Priorities + Calls for	Frightening Language + Listing Impacts + Support	Frightening Language + Listing Impacts	Disaster	Legal Action

Table 6: Primary and Secondary Cycle Coding (results compiled by the author for this study)

4.4 Findings and Analysis

In the previous section the researcher detailed the coding process of the frame analysis used to answer the research question *How did South African online news media construct the climate change issue during December 2019?* This section will present the findings of the two cycles of coding and analyse these results, focusing on how often and in what context the selected frames were found.

4.4.1 The Frequency and Percentage of Frames in Articles Analysed

Through a frequency analysis, the researcher was able to determine the number of times each frame occurred in the articles analysed.

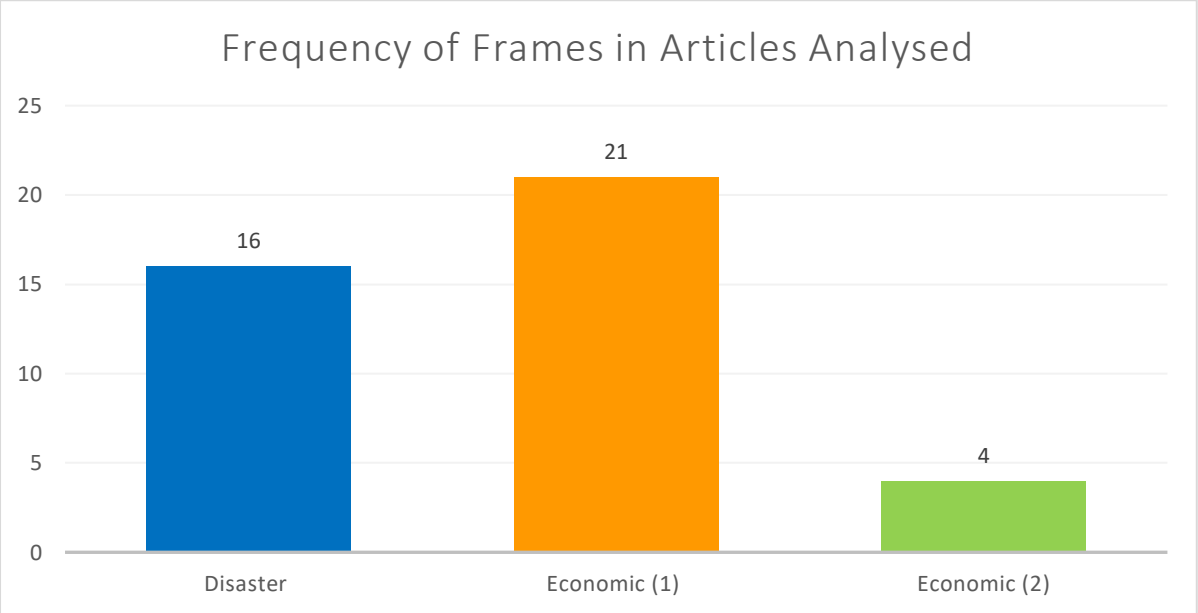

Figure 2: The number of time articles used the disaster, economic (1) and economic (2) frames

The bar chart above gives an account of the number of times each of the chosen frames occurred within the sample size.[22] It shows that the *economic (1)* frame appeared the most often and the *economic (2)* frame appeared least often. Of all 58 articles analysed, the researcher determined the presence of the selected frames, 41 times. Thus, the *disaster* and *economic (1)* frames made up 39% and 51% of the frames found in the data set, while the *economic (2)* made up only 10%.

[22] Figure 2 gives an account of the *number of times* (frequency) each *frame* was found in the selected articles. This is necessary as some articles contained more than one frame. This bar chart does not give a breakdown of the percentage of *articles* that contained the selected frames. This can be found in Figure 3.

This shows a relatively fair distribution of the use of the *disaster* and *economic* frame by South African online news media during December 2019. Nonetheless, it is clear that the *economic* frame was found on more occasions. Overall, this may suggest that climate change has been represented in South African online news media as a worrying and impending disaster in addition to an issue that predominantly warrants monetary action or may result in monetary loss.

Figure 1 provides a simple display of which frames South African online news media used most within the study period. The pie chart in Figure 2, however, illustrates how often these frames occurred with one another and how often they appeared alone. Furthermore, the pie chart shows that there were no frames found in almost half of the articles in the sample.

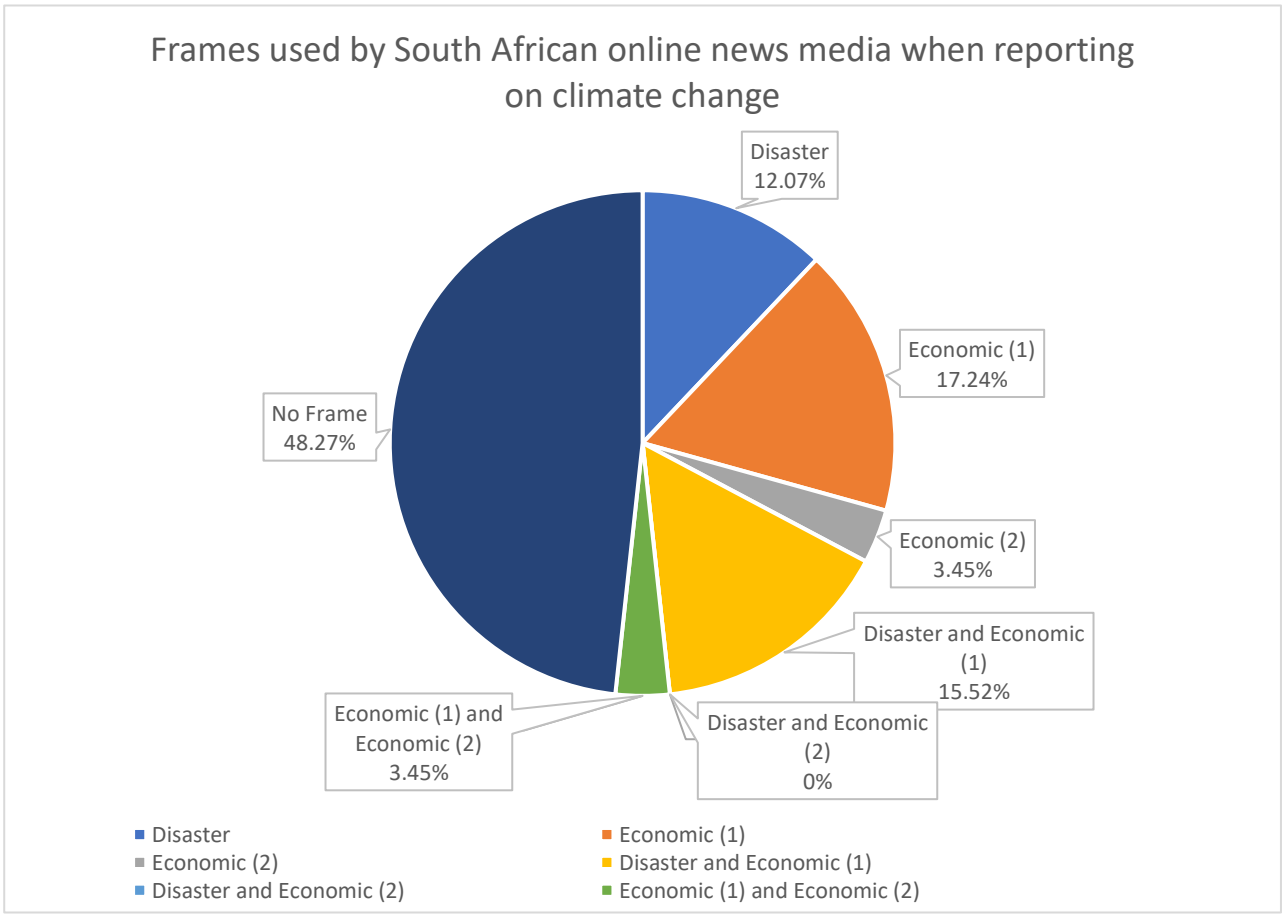

Figure 3: Occurrence of disaster, economic (1) and economic (2) frames in South African online news media during December 2019

This pie chart shows that in almost half of the articles analysed in this study, no frame was found. Nonetheless, 17.24% of articles in the study made use of the *economic (1)* frame on its own, while 15.52% of articles were recorded as making use of both the *disaster and economic*

(1) frame. The *disaster* frame on its own was detected in 12.07% of articles analysed. The *economic (2)* frame appeared the least often in the dataset, is found on its own in only 3.45% of articles and in conjunction with the *economic (1)* frame also in only 3.45% of articles. The combination of the *disaster* and *economic (2)* frame was not found in the articles analysed.

In short, Figure 1 and Figure 2 show that South African online news media did not make use of any of the frames coded for in almost half of the articles analysed. Nonetheless, it is clear that the *economic* frame was used comparatively more often than the *disaster* frame, suggesting that the climate change issue has been constructed more in terms of economic solutions and impacts than in terms of environmental disaster.

This view will be unpacked in more detail in the following sections as the results of the frame analysis are discussed and analysed. To do this, the researcher will discuss the circumstances under which the above results occurred, reflect on why these results occurred, and attempt to locate them within broader environmental geopolitical discourses.

4.4.2 No Frame

It can be gleaned from the above that in almost half (48.27%) of the articles analysed, no frame was present. This means that either the descriptive codes that were allocated in the primary cycle of coding did not 'add up' to any one frame or that there were no descriptive codes present in the given article (this occurred on one occasion for News24 30). Overall, this result may be because these articles simply did not frame the climate change issue in a particular fashion, or because these articles represented the climate change issue within frames that the researcher did not code for.

The majority of articles the researcher documented as 'no frame' were coded with one or more descriptive codes; however, when put together, these descriptive codes often fell under one focused category (2nd-level code), or two unrelated focused categories and thus did not meet the requirements for any of the frames coded for. A large portion of these articles reported on the Australian bush fire and aspects of COP25. Other articles discussed climate change in relation to other issues or in terms of recent scientific research, technological innovation and President Vladimir Putin's views on the cause of climate change.

The disastrous Australian bushfires burnt during the last months of 2019 and into January 2020 (van Oldenborgh *et al.*, 2020: 1). This natural disaster resulted in at least 34 fatalities, the destruction of 5,900 buildings and the loss of between 0.5 to 1.5 billion wild animals and

thousands of livestock (van Oldenborgh *et al.*, 2020: 2). The fire was arguably at its peak during December 2019, and so many online news articles included in this study reported on the disaster. In articles that were recorded as having 'no frame' and that discussed the Australian bushfire, the researcher observed several similarities.

What made these articles distinct was the fact that although they focused on reporting on new developments in this natural disaster, mention of climate change in relation to the fires was often limited to one or two lines linking the disaster back to global warming. The researcher reasons that because 'climate change' was not necessarily the main topic of these articles, there was not sufficient discussion of the issue for a frame to be present. For future research, researchers may opt to make purposive sampling stricter, so that this is not an issue.

On the other hand, certain articles that discussed COP25 and were recorded as having 'no frame' such as News24 28, News24 30, SABC 11 and SABC 19 discussed the climate change issue sufficiently. The reason for this outcome may be a result of the limited number of frames the researcher coded for in this study.

It should be reiterated that, due to resource and time constraints, when making use of the framing scheme of O'Neill *et al.* (2015) for climate change communication, the researcher chose to code for two frames. These were the *economic (1+2)* and the *disaster* frames. These particular frames were chosen as they act as building blocks for more than one environmental discourse, as is outlined by Dryzek (2013). These discourses include ecological rationalism, sustainable development, ecological modernization and survivalism. O'Neill *et al.*'s framing scheme, however, includes several other frames that are popular in climate change communication. These include frames such as *settled science, uncertain (and contested) science, political or ideological struggle, opportunity, morality and ethics, security* and *health.*

COP25, which took place in 2019, was characterised by disagreements about the Paris Agreement commitments. These included negotiations around enhancing Paris Agreement commitments and the ultimate failure to agree on rules to set up a global carbon trading system, and a means to finance countries already facing the impacts of climate change (Newell & Taylor, 2020: 582). Furthermore, COP25 was held against a background of worldwide climate protests, a rise in populism and the evidence of a warming planet, manifest in bushfires in Australia, forest fires in Indonesia, wildfires in California, the burning of the Amazon in Brazil, record temperatures in India and unprecedented storms in the Caribbean (Newell & Taylor,

2020: 580). In line with these developments, articles such as News24 28, News24 30, SABC 11 and SABC 19 wherein 'no frame' was found tended to detail these negotiations.

Bearing the above in mind the frame, *political and ideological struggle*s may have been present in articles such as News24 28, News24 30, SABC 11 and SABC 19 where 'no frame' was found. The *political and ideological struggles* frame in this sense represents the climate change issue in terms of political and ideological conflict over climate change solutions and strategies, especially policy and policy details (O'Neill *et al.*, 2015). This conflict is often between nations or groups – as was exemplified by negotiations between the Parties (O'Neill *et al.*, 2015)

Similarly, this may also have been the case with other articles wherein no frame was found. If the researcher had coded for the *settled science* frame, for example, it might have been present in articles that detailed new scientific research such as eNCA6 and eNCA22. The *settled science* frame in this sense represents climate change in terms of scientific consensus and emphasises the fact that there is considerable evidence to support the need for climate action (O'Neill *et al.*, 2015). Similarly, the *uncertain (and contested) science* may have been present in articles discussing Putin's climate scepticism such as News24 9 and eNCA 8.

Overall, the fact that 48.27% of articles in this study did not make use of the *disaster* or *economic* frame is to be expected as, by design, this study did not seek to unveil *all* climate change-related frames in its coding process. In other words, this study only aimed to understand how often and in what way South African online news media used the *economic* and *disaster* frames and, in this way, gain more understanding of how the climate change issue has been represented.

The percentage weighting of the frames that were found in the study and the conditions under which they occurred is therefore still useful in understanding the way in which South African online news media framed climate change. Accordingly, the following sections will make sense of the frequency and the conditions of frames and frame combinations that were found in the coding process.

4.4.3 Disaster

The *disaster* frame, as discussed in Section 4.2, constructs climate change as something that warrants fear and may elicit images of doom. Additionally, this frame represents the issue of climate change in terms of its impacts rather than the solutions needed to combat it. The *disaster* frame made up 39% of the 41 frames found in the dataset. Still, the disaster frame was

often found in junction with other frames, most notably the *economic (1)* frame. The *disaster* frame was found on its own in only 12.07% of articles.

The fact that the *disaster* frame appeared in more instances with the *economic (1)* frame than on its own will be discussed in the next section. Here, the presence of the *disaster* frame in the articles coded will be discussed, and thus the content of articles that were recorded as *disaster* as well as *disaster and economic (1)* will be analysed, focusing more so on the disaster aspect of the latter.

The researcher noted that in at least three instances the *disaster* frame was found in articles that focused on climate change-related protests in 2019, and most notably, on Greta Thunberg. In 2018, 15-year-old Greta Thunberg began protesting outside the Swedish parliament to draw attention to the 'climate crisis' (Jung, Petkanic, Nan & Kim, 2020: 1). By 2019, Greta's strike action had gone viral, resonating with millions of young people across the world and sparking protests in at least 120 countries (Jung *et al.*, 2020: 1). It is evident that articles which reported on climate change protests and Greta Thunberg characterised climate change as a dire situation that needs to be treated as an emergency. Furthermore, in reporting on these climate change protests, online news media communicated the protesters' sense of an impending 'climate catastrophe.' Overall, the use of the *disaster* frame in such articles speaks to the fear and urgency expressed by climate change protesters.

The *disaster* frame was also notably found in several articles that reported on the COP25 conference in December 2019. In these articles, the *disaster* frame was often used to describe the impacts of climate change already being felt, in addition to worrying scientific findings. While articles that reported on climate protests as discussed above communicated the fear and urgency of civil society in the light of the climate change issue, the presence of the *disaster* frame in articles discussing COP25 suggests an awareness that global governance of climate change is occurring under increasingly dire circumstances.

In Chapter 2, Section 2.3.2, the various environmental narratives that make up environmental geopolitics were discussed. Drawing from the principles of critical geopolitics, attention was given to the notion that that knowledge is not neutral and that it is vital to examine how and why important issues such as climate change are represented the way they are. It was made clear that the way environmental issues such as climate change were framed affected which aspects were given more attention and ultimately how they were dealt with.

The *disaster* frame works as a building block for aspects of the survivalist environmental discourse. The survivalist discourse maintains that issues emanating from the environment cannot be addressed with 'business-as-usual' measures and incremental changes. Furthermore, this discourse makes use of images of apocalyptic doom and disaster. Although this study did not code for all aspects of the survivalist discourse (such as neo-Malthusian principles and securitization), these particular aspects of the survivalist discourse are evident in articles that presented the *disaster* frame. This suggests that aspects of South African online news media's reporting on climate change resemble features of the survivalist discourse.

In this case, findings from the coding process shows that South African online news media have represented climate change within the *disaster* frame and thus within the survivalist discourse. In doing so, South African online news media have constructed and mediated climate change as an extremely worrying and fear-provoking phenomenon. Furthermore, this representation of climate change places a specific and pessimistic focus on present and future impacts.

Importantly, framing climate change in this manner contributes to constructing a 'common sense' understanding of climate change as a disastrous and monumental challenge. The literature shows that it is on this terrain of 'common sense' that geopolitical actors such as policy makers and industry leaders map out their decisions and practices. In this way, the alarmist sentiments that the *disaster* frame reiterates may bolster the argument for climate change solutions that are not 'business-as-usual' or incremental (Dryzek, 2013: 40). Therefore, when climate change is framed as a disaster, it justifies material management and requires a restructuring of industrialised society (Dryzek, 2013: 14).

4.4.4 Economic (1)

The *economic (1)* frame, on the other hand, constructs climate change in terms of its economic solutions or resulting economic costs. This frame differs from the *economic (2)* frame, as it uses economic justifications to argue for climate action rather than against it. Overall, this frame made up 51% of the 41 frames discovered in the articles analysed. Out of all articles analysed, however, the *economic (1)* frame was found on its own in 17.24% of articles and in conjunction with the *disaster* and *economic (2)* frame in 15.52% and 3.45% of articles respectively. It can be gleaned from the above that the *economic (1)* frame was found the most often in the articles analysed.

The researcher noted that a large portion of articles that used the *economic (1)* frame focused on the COP25 meeting and its proceedings. This frame was often found in phrases that discussed the market-based mechanisms (such as the carbon credits, trading and markets) and financing that are needed to limit climate change in addition to the measures needed to transition to a low-carbon economy. Overall, articles that contained the *economic (1)* frame placed a heavy emphasis on the need to reduce carbon emissions. Thus, when represented by the *economic (1)* frame, the climate change issue was often characterised as an emissions-reduction problem.

Because the period for this study is December 2019, the articles analysed picked up on many of the COP25 negotiations that took place that month. It is thus likely that the *economic (1)* frame was often present in articles that reported on COP25 since, central to many of these negotiations, was the issue of UN carbon markets and how these would be set up. The researcher notes that this may also be reflective of an emphasis on climate change mitigation (which emphasises the need to reduce emissions) rather than climate change adaptation.

Drawing from the above, it is clear that the presence of the *economic (1)* frame in 17.24% of all the articles analysed indicates that South African online news media have placed a great deal of emphasis on the market-based mechanisms needed to reduce carbon emissions. This fact speaks to the shape of COP25 negotiations which often represented the climate change issue as an 'emissions reduction' issue.

When located within the broader literature on geopolitics and the environment, the *economic (1)* frame falls into more than one discourse. Firstly, the *economic (1)* frame fits neatly with aspects of the economic rationalism discourse as it favours the deployment of market-based mechanisms when dealing with environmental issues. This frame also speaks to aspects of the sustainable development and ecological modernization discourse with its acknowledgement of the necessity of economic growth that is environmentally benign and socially just, and the restructuring the capitalist system to be more environmentally friendly (Dryzek, 2013: 156; Hajer, 1995: 25).

Notably, the above-mentioned environmental discourses are reformist in their nature. In other words, they acknowledge that action is required, but maintain that this action can be sourced from the current structures and organisation of industrialised society. Therefore, in a broader sense, the frequency of the *economic (1)* frame in the articles analysed and the context within which it often occurred suggests a clear emphasis on a 'business-as-usual' approach to the

climate change issue – an approach that has markedly been embodied by the UNFCCC institutions. It can hence be argued that South African online news media have reiterated this framing or representation of the climate change issue more often than, for example the previously discussed *disaster* frame and the *economic (1)* frame discussed below.

4.4.5 Economic (2) and Economic (1) & Economic (2)

The *economic (2)* frame is similar to the *economic (1)* frame in that it represents climate change in terms of the economic costs of solutions and impacts, and thus also speaks to aspects of discourses such as economic rationalism, sustainable development and ecological modernization. This frame differs, however, in its justification of inaction because of these economic costs. The *economic (2)* frame was found the least often, appearing only 4 times – twice on its own (News24 26 and SABC14) and twice along with the *economic (1)* frame (SABC8 and eNCA7).

On both the occasions when the *economic (2)* frame appeared on its own, the articles discussed the COP25 conference. In News24 26, this frame was found in views expressed by the head of environmental affairs in Egypt, Mohamed Nasr, who explained that climate action was extremely expensive and not as easy to implement for developing like Africa. SABC14, on the other hand, detailed how several countries are pushing back on enhancing their climate action ambitions.

In the two articles where the *economic (2)* frame was detected alongside the *economic (1)*, the 2nd-level codes that make up the frame were coded in sentiments expressed about the Australian Prime Minister Scott Morrison. In both instances, the articles discussed Morrison's inadequate climate change policies and his support for Australia's coal mining industry in the light of the Australian bushfires. In these instances, the *economic (2)* frame indicated Morrison's conservative climate change policies in addition to highlighting criticism of this inaction as is highlighted by the presence of the *economic (1)* frame in both cases.

Like the *economic (1)* frame, the *economic (2)* frame locates itself within the same broader literature on geopolitics and the environment. It is thus also a reformist discourse in that it acknowledges that action is required to combat climate change, but maintains that this action can be sourced from the current structures and organisation of industrialised society. It differs from the *economic (1)* frame however, in that it does not believe that this action is valid because of its economic costs. The representation of climate change through this particular frame creates the 'common sense' understanding that the climate change issue is too costly a dilemma

to invest money in. Overall, the *economic (2)* frame validates climate scepticism and climate change inaction by important geopolitical actors such as state leaders and policy makers.

The researcher argues that the ideas reiterated by the *economic (2)* frame are not a commonly communicated representation of the climate change issue by South African online news media. The researcher came to this conclusion for two reasons. Firstly, this frame was found in only a small percentage of the articles analysed. Secondly, in half of the instances where this frame was identified, it was accompanied by the *economic (1)* frame, indicating that articles may have provided a more 'balanced' representation of the climate change issue rather than framing it purely in one way.

4.4.6 Disaster and Economic (1)

The combination of the *disaster and economic (1)* frame was found in 15.52% of all articles coded, making up the second-largest frame occurrence, after the *economic (1)* frame. The presence of this frame combination is interesting in that articles that made use of it characterised the climate change issue in terms of its disastrous and worrying effects in addition to the economic reasoning for climate action.

Seeing that over half of the articles that contained this frame combination reported on the aspects of the COP25 proceedings, this may reflect the way in which the IPCC and the COP25 process has characterised the climate change issue.

In the previous section, the researcher noted that the *economic (1)* frame tended to appear in articles that reported on COP25. In this section, the researcher suggested that this may be a reflection of the UNFCCC's preferred methods of climate action, or echo the central negotiations at the conference. Keeping in mind this observation may help understand why the *disaster* and *economic (1)* frame often appeared together in the context of COP25.

As is discussed in Chapter 3, Section 3.5, the IPCC is tasked with gathering scientific information on the climate issue in addition to proposing realistic solutions (Pittock, 2005: 247). The latest IPCC report, titled *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change*, outlined a troubling future, if global mean temperatures rise a further 1.5°C and 2°C. Furthermore, the report notes that the world has only 12 years left to reduce global warming before certain tipping points are reached (IPCC, 2018).

In a study by Ogunbode, Doran and Böhm (2019), researchers found that this particular IPCC report was linked to perceptions of threat and increased concern about climate change (Ogunbode, Doran & Böhm, 2020). Although this only provided preliminary evidence for a country-specific (Norway) sample size, it does provide a useful hint as to why the *disaster* and *economic (1)* frame appeared alongside one another in several COP25-specific online news articles. It suggests the possible increased perception of threat and concern in the light of the worrying scientific warning by the IPCC which formed the backdrop of the COP25 conference.

When situated within the broader literature on climate change, the *disaster and economic (1)* frame does not fit neatly with any one environmental discourse. While it resonates with certain aspects of the sustainable development and ecological modernization environmental discourses (both of which acknowledge the importance of economic growth and the economic consequences of climate change), this frame combination communicates more fear than is traditionally present in these discourses. Still, this frame combination does not necessarily fit within the survivalist or economic rationalism discourses either, as it acknowledges the role of economic rationalism but also the disaster aspect of the climate change issue.

For these reasons, it can be argued that in the light of increasingly worrying scientific evidence regarding climate change, the use of the *disaster* and *economic (1)* frame together may illustrate a new development of these discourses. While the use of the *economic (1)* frame indicates a favouring of 'business-as-usual' climate action which is typical of the UNFCCC institutions, the use of the *disaster* frame may suggest a sense of urgency, fear and recognition of the current dire state of natural and human systems in the light of climate change.

Overall, this indicates that in 15.52% of articles analysed, South African online news media have represented the climate change issue as both a disaster and put economic (market-based) solutions at the forefront of discussions. In this way, the media have acknowledged that the effects of climate change warrant fear and a sense of urgency, while positing the solution to these effects as primarily entailing climate change mitigation or emissions reduction.

In summary, this section analysed the findings of the frame analysis, exploring the circumstances they appeared under and situating them within broader environmental geopolitical discourses. Important outcomes of this section included the fact that the *economic (1)* frame was found most often in the analysed articles, suggesting that South African online news media have represented climate change in terms of its economic costs and solutions, especially market-based emissions reduction efforts. Secondly, the fact that the *disaster* frame

was notably found alongside the *economic (1)* frame indicates that media have brought a new sense of urgency and fear to the typical 'business-as-usual' climate action representation reiterated by the UNFCCC.

4.5 Conclusion

In closing, the impetus for this chapter was the principles of critical geopolitics and the arguments of popular geopolitics. The researcher conducted a frame analysis to gain more understanding of how the climate change issue was constructed by South African online news media.

This chapter described this process, firstly, by outlining the frames coded for in this study, the *disaster* and *economic* frames. It was explained that while the *disaster* frame represented the climate change issue in terms of its disastrous effects, the *economic* frame emphasized the economic costs and impacts of climate change. After that, in outlining the primary and secondary cycles of coding, a thorough breakdown of how these unique frames were coded was set out with conceptualisations of both 1st-level and 2nd-level codes. To further explain this process, the way in which six exemplary articles were coded was also detailed for clarification.

The final section presented the findings of the coding process. The results were discussed and analysed to address the research question of this study. Overall, this chapter showed that South African online news media constructed the climate change issue by making use of the *economic (1)* frame on its own more often than the *disaster* and *economic (2)*. Interestingly, the researcher found that a considerable number of articles framed climate change with the *disaster* and *economic (1)* at the same time. Separately, these frames speak to aspects of two distinct types of discourses (reformist and radical). When combined, however, these frames show how media have placed reformist, market-based and emission-reduction measures as central to the climate change issue, while also communicating a sense of urgency and impending doom in the light of new scientific findings and current impacts.

5 Conclusion

5.1 Introduction

This final chapter concludes the study by reflecting on its relevance and its objectives, addressing the research question it aimed to answer, and offering the researcher's recommendations for the future. The first section of this chapter will accordingly consider the relevance and objectives of this study and provide a description of its process from start to finish. Furthermore, the process of qualitative coding will be described. The final section of this chapter will answer the research question, drawing from the findings in Chapter 4 and end by offering the researcher's recommendations for future research.

5.2 Relevance and Objectives of the Study

In 2020, the reality of climate change has become glaringly evident, with increasingly frequent and intense impacts being felt all around the world. In 2019, the sheer scope and reach of the ramifications of climate change in the light of an arguable lack of urgency and blasé attitudes from those in positions of leadership, spurred millions of young people to protest. Overall, these protesters maintained that terms such as 'environmental breakdown,' and 'climate crisis' are far more fitting for the scale of the challenges.

In his seminal paper, Mike Hulme argues that because 'climate' cannot be experienced directly, our understanding of a *climate change reality* is constructed (Hulme, 2009: 43). Just like the above description of the actual reality of climate change, the 'reality' of climate change is a fundamentally constructed concept. Especially in the age of digital media, online sources such as online news media undoubtably play an important role in how this climate change reality is constructed. Overall, these factors were the impetus for this study.

The stated objective of this study was to shed light on how the climate change issue was constructed in South African online news media. To fulfil this task, the researcher began by explaining the significance of this study in the context of the literature on geopolitics and the environment.

5.3 Evolution of the study

The evolution of this study was guided by theoretical points of departure, which were determined through a review of the literature on geopolitics and the environment. These theoretical points of departure ultimately justified the need for the study by situating climate change within the broader literature on geopolitics and the environment.

5.3.1 Theoretical Points of Departure and Contextualisation

This study was largely premised on the principles of critical geopolitics and their importance for environmental issues, especially in the light of 'popular' sources such as online news media.

In Chapter 2, the importance of examining *how* issues such as climate change are constructed was brought to light by locating this study in the broader field of geopolitics. In short, by locating this study within the field of geopolitics, its theoretical points of departure were explained. While geopolitics often describes the interface of international relations and geographies, it is in fact a distinct field of study (Agnew, 2003: 5) which evolved from classical geopolitics to contemporary geopolitics. Although this study takes its lead from contemporary geopolitics, it was important to discuss its classical counterpart, as this predecessor ultimately shaped the nature of contemporary geopolitics.

While classical geopolitics attempted to create a 'scientific' and objective understanding of why states flourished, struggled, cooperated and waged war, contemporary geopolitics emphasized the need to challenge statements of authority by those claiming to have an objective understanding of the world. Contemporary geopolitics is not limited to a consideration of the decisions relevant actors make, but also takes into account the way in which these actions are represented and justified. The importance of understanding the way in which actions are represented and justified is the crux of this study.

Environmental geopolitics demonstrated how different environmental discourses represent and justify environmental issues such as climate change. The literature on discourses like problem solving, survivals, sustainability and green radicalism showed the different ways in which environmental issues can and have been represented. It also shows how various representations necessitate specific kinds of practical management. For example, the problem-solving discourses take the current organization of the state as a given and environmental issues as unique challenges to resolve within state boundaries mechanisms. This implies that issues such as climate change are represented as problems that can and should be solved through state-based mechanisms such as administrative mechanisms, the democratic process and market-based mechanisms. Through such constructions of environmental issues, solutions are presupposed to emanate from these state-based mechanisms of liberal capitalism.

Alternatively, discourses such as the survivalist discourse represent the environment as a limited resource that will eventually become exhausted. This discourse focuses on the dire consequences of environmental impacts, evoking a sense of fear. When the environment is

represented in this way, then solutions do not take the form of 'business-as-usual' mechanisms as the problem-solving discourses do. Overall, solutions proposed in light of this representation of environmental issues are often more *radical* than *reformist*.

Drawing from critical geopolitics, popular geopolitics takes these notions a step further by exploring the geopolitical relevance of representing issues such as climate change in the popular media. Proponents of popular geopolitics accordingly argue that when issues (such as climate change) are represented in the popular media, they create 'geopolitical imaginations', constructing geographical and political realities. The construction of geopolitical imaginations thus cements taken-for-granted truths about the world and how power should be applied (Dittmer & Bos, 2019: 41). The literature on popular geopolitics shows that the way in which these geopolitical imaginations are constructed, through the operations of the popular media, has tangible effects for the material process of management by influencing policy and state action (Grayson *et al.*, 2009: 157).

This tangible effect stems from the notion that "dominant geopolitical actors map out lives and practices on a terrain of (inter)national consciousness – a hegemonic 'common sense' – to which they and the mass media through their representational practices have contributed" (McFarlane & Hay, 2003: 229). This is especially relevant for the climate change issue – a phenomenon that is vastly complicated and is not easily understood in its entirety by the lay-person. The mediation of the climate change issue to wider non-specialist audience therefore relies heavily on media sources.

As noted above, climate change is an extremely complex phenomenon. The insight gained in understanding how this issue may be represented or constructed is thus contingent on an in-depth understanding of the complexity of the climate change issue. Chapter 3 in particular focused on this point. It aimed to contextualise the focus of this study by explaining the basic climate science behind the phenomenon of climate change in addition to discussing the various impacts it has on natural and human systems. The complexity of climate change was exemplified through a discussion of the systematic and cumulative nature of the phenomenon in addition to the associated timescales and important tipping points that should be considered.

It was also pertinent to discuss the global governance responses and various solutions to climate change as these are often the focus of news reporting on climate change. The structure of the UNFCCC was explained, paying specific attention to international agreements such as the Kyoto Protocol and the Paris Agreement, and to solutions such climate change mitigation and

adaptation. These solutions included mitigation measures such as emissions reduction and adaptation measures such as ecosystem-based adaptation (EbA). These explanations of climate change played an important role in interpreting the results of this study as these findings relied on an understanding of climate change governance and solutions, with particular reference to the chosen period of study, December 2019, the month of COP25.

5.3.2 Framing and Qualitative Coding

With the above literature and contextualisation in mind, the researcher set out to ascertain *how* to conduct a study of this 'construction' of climate change in practical terms. The researcher opted to make use of 'frames' to gain insight into how climate change was constructed in online news media. 'Framing' in particular was chosen because of the conceptual overlap between geopolitics and framing theory (a detailed discussion of this can be found in Chapter 1, Section 1.5). Qualitative content analysis was accordingly used to determine the presence of frames in the sample of articles analysed.

The two frames chosen for this study were the *disaster* and *economic* frames. The researcher chose to deductively code for these particular frames as they formed the building blocks of several environmental discourses. The *disaster* frame, for instance, is characteristic of aspects of the survivalist discourse, while the *economic* frame fits parts of the economic rationalism and suitability discourses. This study drew especially on the work of O'Neill *et al.* (2015) and supplemented this with Dryzek (2013) to explain these frames.

The *disaster* frame constructs the climate change issue as something that warrants being fearful. Key elements of this frame, apart from the use of frightening language, include its focus on the impacts of climate change and the nature of these impacts. The *economic* frame, on the other hand works, to characterise the climate change issue in terms of the monetary costs that may come along with climate action commitments (such as the Paris Agreement) and climate change-related impacts. For this study, the *economic (1)* frame represented the economic costs of climate change as something necessary and possible, while the *economic (2)* frame characterises the economic cost of climate change as justification for no action.

With the above frames in mind, the researcher created a coding scheme to aid in determining whether they were present in the articles analysed. The coding scheme was explained in Section 4.3; the researcher coded for 1st-level codes in a primary cycle of coding by analysing each article itself and assigning descriptive codes. After that, in a second cycle of coding, the researcher organised these 1st-level codes into focused categories and ascertained whether they

met the criteria for the presence of one or more of the selected frames. Where neither of the frames were detected, the article was recorded as containing 'no frame.' This method proved to be both objective and replicable.

The results of this coding process were displayed in both a frequency bar chart and a pie chart, thus representing results in terms of the frequency at which each code occurred and the proportional frame occurrence combinations. Chapter 4 accordingly discussed and analysed these results, paying specific attention to both the frequency of frame occurrence and the conditions under which these frames occurred. In this way, the researcher gained more insight into how South African online news media constructed the climate change issue by understanding how often these frames were present and the type of content that these frames are typically found in.

5.4 How did South African online news media construct the climate change issue during December 2019?

This study sought to gain more insight into how South African online news media constructed the climate change issue during December 2019 based on the premise that online news media articles contribute to creating a 'common sense' understanding of the issue. This was to find an answer to the research question: "How did South African online news media construct the climate change issue during December 2019?"

As discussed above, this study searched for two unique frames in the selected online news articles analysed. After two cycles of qualitative coding, the findings in Chapter 4 showed that the *economic (1)* frame appeared most often, whilst the *economic (2)* frame appeared least often. Overall, out of all 58 articles, the selected frames were found a combined total of 41 times. Herein 51% were *economic (1),* 39% were *disaster* and the *economic (2)* frame made up 10%.

When understood in terms of the frequency at which each frame occurred, it appears that South African online news media constructed the climate change issue as an economic one that *warrants* economic action. By looking at the frequency occurrence alone, it thus seems a simple conclusion that South African online news media constructed the climate change issue as an issue that can be fixed through *reformist,* business-as-usual mechanisms – specifically market-based, economic mechanisms.

This being said, when one looks at the percentage occurrence of the frames identified in this study in terms of the ways and conditions under which they occurred, an even more insightful

answer to the research question may be formulated. In Chapter 4, Figure 2, the researcher shows this breakdown. Key takeaways from this pie chart are that 48.27%[23] of the articles analysed contained no frame, 17.24% contained the *economic (1)* on its own, 12.07% contained the *disaster* frame on its own, and 15.52% contained both the *economic (1) and disaster* frame. This percentage breakdown therefore provides more detail on the way that South African online news media framed the climate change issue and thus constructed it.

Herein, it is clear that although the majority of articles that contained frames *did* frame the climate change issue as an economic issue that warranted economic action – 15.52% of these articles framed climate change as also warranting fear and radical change through the use of the *disaster* frame. This is a unique construction of the climate change issue as it has both *reformist* and *radical* elements.

The researcher argues that the prevalence of this combination of frames may be a result of the increasingly worrying scientific evidence on climate change, specifically the 2018 IPCC report. Thus, South African online news media have framed climate change in a way that constructs it as an environmental issue that can be fixed through economic reform, market-based mechanisms and business-as-usual procedures in addition to acknowledging a sense of fear and urgency in recognition of the dire current and future states of natural and human systems.

In short, South African online news media framed the climate change issue mostly through a reformist, economic rationalist discourse that naturally favours solutions that work to mitigate climate change through emissions-reduction measures. This construction of the climate change issue is typical of the UNFCCC, which is known to advocate for climate change solutions that make use of market-based mechanisms such as carbon markets and favour solutions that cause the least amount of economic harm.

Still, a prominent number of articles made use of the *disaster* frame, suggesting that although South African online news media clearly emphasised the economic and market-based aspects of climate change, they also communicated a sense of fear and doom about impending climate change.

Overall, it can be argued that the ‘common sense’ understanding or ‘geopolitical imagination’ that South African news media have constructed in framing the climate change issue in the

[23] The fact that 48.27% of the articles analysed did not contain any of the frames coded for is to be expected due to the nature of this study. This is discussed in more detail in Section 4.4.2.

above manner is one that places economic and market-based solutions at the forefront of discussions, whilst also emphasising the increasingly worrying nature of climate change impacts. Interestingly, this means that South African online news media have communicated the climate change issue as an issue that warrants radical change, and at the same time placing the emphasis on reformist, business-as-usual solutions.

5.5 Recommendations for the future research

In the light of the above findings, the researcher has noted several ways in which the findings of this study may be expanded on in future research. These recommendations mostly involve changes to the scope (size and length) of the study – utilising resources that were not available to this researcher.

Firstly, in attempting to reveal how the climate change issue has been constructed by South African online news media, this study coded for two prominent climate change-specific frames – as described by O'Neill *et al.* (2015) and supplemented with reference to Dryzek (2013). As mentioned in the previous sections, these frames were the *economic* and *disaster* frames. Not only did the researcher choose these frames to keep this study to a reasonable size but also because they make up the basic tenants of reformist and radical environmental discourses.

Yet, as noted in Chapter 4, there are several other climate change-specific frames that may have been present in the articles analysed, but were not coded for. The researcher recommends coding for more or all possible climate change frames in future, if resources allow. By doing so, future studies may glean a deeper and more expansive understanding of how climate change is constructed in online news media. Furthermore, greater insight into the 48% of articles that did not contain either frame (indicated as 'no frame' in this thesis) may be gained by coding for more frames.

Secondly, future research should consider a research methodology that involves triangulation of data. The importance of taking up the call of critical geopolitics lies in the fact that the way in which issue are represented plays an important role in their material management. This link between the representation or construction of climate change in online news media and its material management is contingent on the creation of a 'common sense' understanding of climate change. It thus may be useful to investigate what this 'common sense' understanding or 'geopolitical imagination' is for the lay-person.

Finally, this study analysed articles posted on South African online news platforms during December 2019 – the month during which the COP25 conference was held. The findings of

this study were thus reflective of news articles reporting on the negotiations and takeaways from this conference. The researcher suggests a longitudinal research design, where resources allow, as this may provide a less narrowly focused understanding of how climate change is represented through online news media.

5.6 Conclusions

In closing, this study located itself within the field of critical geopolitics, by emphasising the need to understand the underlying assumptions that underpin definitive statements by authority figures. More so, it worked on the premise that the way in which these statements construct issues ultimately build 'imagined geopolitical landscapes' of what the reality of the said issue is. The above notions were considered particularly important for coming to terms with complex phenomena such as climate change that cannot be observed or comprehended in their entirety by the non-specialist. Unless one is a climate scientist, one's understanding of the 'climate change issue' is mostly reliant on what has been communicated through heads of states, policymakers, international leaders and the popular media. Bearing in mind the influence of the internet in the age of digital media, this study chose to place its focus on how online news media platforms communicated the climate change issue. Overall, this study found that South African online news media constructed climate change as an issue that warrants fear and concern, whilst placing 'business-as-usual,' reformist solutions at the forefront of their discussions.

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7 Appendix A

7.1 News24 13

Title: 'Cleaner and cheaper': Sunny Spain is banking on renewable energy	Website: News24
Author: Aljazeera	Search word: climate change
Date: 16 Dec 2019	Article #: 13

'Cleaner and cheaper': Sunny Spain is banking on renewable energy

Although the outcome of the United Nations' COP25 climate conference negotiations may not shine for many observers, hospitable Spain welcomed the opportunity to spotlight its fast-tracked shift to renewable sources of energy.

Commented [PU1]: Low carbon economy

The eco-friendly Socialist caretaker government eagerly pitched its environmental bona fides to tens of thousands who came as diplomats, investors and activists.

Commented [PU2]: Economic

With world attention on its green goals, the climate champions hoped to generate enhanced commitments to reduce emissions globally - and to finance electricity projects powered by the Spanish sun's bright rays and the strength of the Iberian wind.

"We must make this transition. There is no other way," said Jose Dominguez Abascal, Spain's secretary of state for energy.

Commented [PU3]: Progress

Speaking at a COP25 event on European climate finance for Spain, he said the country is becoming "much better in efficiency, electrification of transport and ... the technology to make renewable electricity very cheap".

Commented [PU4]: Opportunity

"Today, producing with sun or wind in Spain is half the cost we have on the wholesale [electricity] market in Spain," Dominguez said. "We need two things: money and to convince companies that the status quo must be modified." "We cannot keep investing in the same things we've invested in," said the minister, referring to oil and gas companies placing bets on projects that risk becoming stranded assets.

Commented [PU5]: Opportunity

Commented [PU6]: Economic

Commented [PU7]: Assets

'Good path for renewables'

Maria Prado, a renewable energy transition campaigner at Greenpeace Spain, said that her country is still "extremely dependent on fossil fuels".
Although the current government of Spain is highly ambitious, climate goals remain far from being realised [Ben Piven/Al Jazeera] At 74 percent of all energy use, Prado told Al Jazeera that Spain is "still 20 points above the average in Europe. Even though we're on a good path for renewables, it's still far away."
Prado said the renewable energy industry is excited that the new government of Prime Minister Pedro Sanchez has been supportive of its growth, especially when viewed in light of the European Union's recent approval of decentralised electricity generation.
Now Madrid is pushing its citizens to become prosumers (producer-consumers), a change enabled by the recent repeal of the "sun tax" - a move that increased competitiveness and decreased electricity prices.
"This year we had 10,000 [solar] installations ... but that's so far away from Germany, Sweden and Denmark," said Prado. "We have the privilege of being the country with the most sun in the Mediterranean."

Commented [PU8]: Market-based

Meanwhile, Spain has a 2030 target for renewables to be 42 percent of all energy. SolarPower Europe says Spain will install more than four gigawatts (GW) of solar power systems this year. The wind sector also continues to grow quickly.

Ratification of Spain's climate change law will likely accelerate the transition and create even more investor appetite for renewables.

'Climate neutrality before 2050'

Spain currently has 28.5GW of renewables - 23.5GW of wind and 5.1GW of solar photovoltaic energy. An additional 62.9GW already has permits but is not operational, two-thirds of which is solar. Beyond that, 84.4GW has been requested by producers.

On the last day of the COP25 conference, climate activists from Fridays for Future and Extinction Rebellion demanded swifter action [Ben Piven/Al Jazeera] One gigawatt is the amount of power harnessed by three million solar panels or 412 utility-scale wind turbines.

The massive quantity of applications far exceeds the country's expectations under the National Climate and Energy Plan for 2030.

"Spain is leading the country into achieving climate neutrality before 2050, fulfilling its international commitments in line with science and the calls for more ambition and robust climate action made by Spaniards in the streets," says a pamphlet on the European Green Deal issued by the Ministry for the Ecological Transition.

"The government is planning to phase out coal and nuclear in the next 15 years, though that's still too much for us," said Mario Rodriguez Vargas, executive director of Greenpeace Spain.

"We will need money from the government and the EU to guarantee a just transition," he told Al Jazeera, adding that the EU's budget in this area will mostly focus on Eastern Europe. "In the climate package released by the Spanish government just before the last general elections, practically 70 percent [of investment funds] come from the private sector," said Rodriguez.

Commented [PU9]: Monetary

Minister for the Ecological Transition Teresa Ribera meets Spanish environmental leaders every few months, Rodriguez said, listening to their concerns.

"In 2007, [Greenpeace] were the first organisation in Spain, and Europe as a whole, that came out with a 100-percent renewable scenario by 2050," he added. "And people then said we were crazy."

'Economies of scale'

Commented [PU10]: Economic

Energy Secretary Dominguez, who works under Ribera, chaired a discussion on Wednesday with three speakers whose organisations - BNP Paribas, the European Investment Bank and Norway's sovereign wealth fund - collectively advise on and lend $2 trillion. Spain's Secretary of State for Energy Jose Dominguez Abascal sought insights from three climate experts at major financial institutions [Ben Piven/Al Jazeera]

The goal was to showcase how Spain can streamline financing for the development of its renewable sector.

"When we invest more money, we get economies of scale," said Mark Lewis, global head of Sustainability Research at BNP Paribas Asset Management. "Things go faster than you can possibly imagine. There's a feedback loop between public policy and technology."

One of the main reasons for the initial success of the Paris agreement, he said, was that the cost of solar power came down from $400 to $120 per megawatt-hour - making it "so much easier for politicians to make the case, when the economics are on your side".
He described renewables as "cleaner and cheaper", making them an obvious investment. "You don't have to look for energy, you don't have to produce, you just have to make the infrastructure to capture it."
The European Investment Bank (EIB), the EU's 555-billion-euro ($617bn) lending arm, agreed last month to phase out fossil fuel investments by 2021.

Nancy Saich, the EIB's chief climate change expert, said the focus was "not just about what we finance more of, but also about what we finance less of".

To that end, she said the door is now shut for any new fossil-fuel projects. "We did four billion euros [$4.4bn] of renewable investments last year, a large chunk of it in Spain," Saich added. "I'm confident it's a good investment."

Norway's $1.1 trillion sovereign wealth fund was instructed by parliament in June to divest billions from fossil fuels and open up to billions in renewables.

Lene Westgaard-Halle, a parliamentarian from Norway's ruling Conservative Party, said that the new policy's goal was "to make Europe cleaner and cut emissions, as well as for us to stay rich".

"It's a political decision," she said, "but also financial. It's important for us to make money."
"This part of the oil fund that we invest in renewables is going to become bigger," Westgaard-Halle added, with a nod towards the Spanish energy secretary. "It's a mix of being an idealist and capitalist."

7.2 News24 14

Title: UN talks struggle to stave off climate chaos	Website: News24
Author: AFP	Search word: climate change
Date: 13 Dec	Article #: 14

UN talks struggle to stave off climate chaos

United Nations climate negotiations in Madrid were set to wrap up on Friday with even the best-case outcome likely to fall well short of what science says is needed to avert a future ravaged by global warming.

Commented [PU1]: Apocalyptic

The COP25 summit comes on the heels of climate-related disasters across the planet, including unprecedented cyclones, deadly droughts and record-setting heatwaves.

Commented [PU2]: Numerous impacts / apocalyptic

Scientists have amassed a mountain of evidence pointing to even more dire impacts on the near horizon, while millions of youth activists are holding weekly strikes demanding government action.

Commented [PU3]: Bleak Science

As pressure inside and outside the talks mounts, old splits between rich polluters and developing nations have re-emerged over who should slash greenhouse gas emissions by how much, and how to pay the trillions needed to live in a climate-addled world.

Commented [PU4]: Calls for

Commented [PU5]: Monetary

Newer fissures, meanwhile, between poor, climate vulnerable nations and emerging giants such as China and India - the world's No.1 and No.4 emitters - may further stymie progress.

But observers and delegates said negotiators had largely failed to live up to the conference's motto: Time for Action.

"We are appalled at the state of negotiations," said Carlos Fuller, lead negotiator for the Association of Small Island States (AOSIS), many of whose members face an existential threat due to rising sea levels.

Commented [PU6]: Apocalyptic

"At this stage we are being cornered. We fear having to concede on too many issues that would damage the very integrity of the Paris Agreement."

Shifting alliances

The narrow aim of the Madrid negotiations is to finalise the rulebook for the 2015 Paris climate accord, which enjoins nations to limit global temperature rises to "well below" 2°C.

Earth has already warmed 1°C, and is on track to heat up another two or three degrees by 2100.

But "raising ambition" on emissions remains the overarching goal in Madrid.

Host nation Spain on Thursday said that rich and developing nations alike were stalling.

"There are two very clear visions," Spain's minister for energy and climate change Teresa Ribera told reporters.

"There are those that want to move quicker and those that want to hide behind things which aren't working, so as not to advance."

The deadline under the Paris treaty for revisiting carbon cutting commitments - known as Nationally Determined Contributions (NDC) - is 2020, ahead of the next climate summit in Glasgow.

But Madrid was seen as a crucial launch pad where countries could show their good intentions.

Nearly 80 countries have said they intend to do more, but they only represent 10% of global emissions.

Conspicuously absent are China, India and Brazil, all of whom have indicated they will not follow suit, insisting that first-world emitters step up.

Restructure global economy

But some countries historically aligned with the emerging giants over the course of the 25-year talks broke rank on Thursday.

"The failure of major emitters - including Australia, the United States, Canada, Russia, India, China, Brazil - to commit to submitting revised NDCs suitable for achieving a 1.5°C world shows a lack of ambition that also undermines ours," AOSIS said in a statement.

The talks received a meagre shot in the arm on Friday after the EU pledged to make the bloc carbon-neutral by 2050.

The much-heralded decision was immediately undermined however by the refusal of Poland - a major emitter - to sign on.

The UN said this month that in order for the world to limit warming to 1.5°C, emissions would need to drop over seven percent annually to 2030, requiring nothing less than a restructuring of the global economy.

Commented [PU7]: Economic

7.3 News24 34

Title: Climate change: the year the world woke up to the emergency	Website: News24
Author: AFP	Search word: climate change
Date: 4 Dec 2019	Article #: 34

Climate change: the year the world woke up to the emergency

Schoolchildren skipping class to strike and protest – spurned on by Swedish wunderkind Greta Thunberg – bringing city centres to a standstill and sounding warnings to leaders across the world dragged the climate emergency into the mainstream in 2019.

Commented [PU1]: Calls for

Commented [PU2]: Emergency

Thunberg - virtually unknown outside of her homeland a year ago but now a global star nominated for a Nobel prize - and millions of young people took part in weekly demonstrations demanding climate action.

The "Extinction Rebellion" movement embarked on a campaign of peaceful civil disobedience that spread worldwide, armed with little more than superglue and the nihilistic motto: "When hope dies, action begins."

The 2015 Paris agreement saw nations commit to limiting global warming to 2°C above pre-industrial levels as a way of curbing the worst impacts of global warming.

A safer cap of 1.5°C was included as a goal for nations to work towards.

With earth having already warmed by 1°C, the United Nations Intergovernmental Panel on Climate Change (IPCC) dropped a bombshell late last year.

Commented [PU3]: Bleak science

Its landmark report in October 2018 laid the groundwork for the string of climate shockwaves that rumbled throughout 2019: the world is way off course for 1.5°C, and the difference between 1.5°C and 2°C could be catastrophic.

Commented [PU4]: Apocalyptic

'12 years to act'

For Corinne Le Quere, president of France's High Commission for Climate Change and member of Britain's Committee on Climate Change, 2019 was "something new".

"I've worked on climate change for 30 years and for 29 of those, as scientists, we've worked unnoticed," she told AFP.

The IPCC report concluded that global CO2 emissions must drop 45% by 2030 - and reach "net zero" by 2050 - to cap temperature rise at 1.5°C.

"It's given us a clear timeline: we have 12 years to act," said Caroline Merner, 24, a Canadian member of the Youth4Climate movement.

But while society and particularly younger generations appear to have woken up to the threat of climate catastrophe, industry shows little signs of sharing their urgency.

Commented [PU5]: Urgency / Apocalyptic

Cyclone Idai, Typhoon Hagibis

Greenhouse gas emissions are once again set to rise in 2019 after hitting a record in 2018, as extreme weather events - made more likely as the planet warms - struck seemingly everywhere this year.

Commented [PU6]: Numerous impacts

Cyclone Idai in Mozambique, typhoon Hagibis in Japan, a deadly, record-breaking heatwave across much of Europe, wildfires in California and eastern Australia, floods in Venice... the list goes on.

Commented [PU7]: Numerous impacts

The threat posed by climate change became so stark in 2019 that Indonesia, one of the fastest-growing economies on Earth, decided to move its capital to somewhere that wasn't sinking.

Faced with an unbreachable body of evidence and mounting pressure from the streets, governments in 2019 started, slowly, to mobilise.

A total of 66 nations now have plans to be carbon-neutral by 2050.

The cities of London and Paris declared official ecological and climate emergencies.

Commented [PU8]: Emergency

7.4 SABC 8

Title: Australian PM defends climate policies as cooler weather helps firefighters	Website: SABC
Author: Reuters	Search word: climate change
Date: 22 Dec 2019	Article #: 8

Australian PM defends climate policies as cooler weather helps firefighters

Fire conditions eased on some of the major fronts burning across Australia on Sunday after a cool weather change, with firefighters trying to contain blazes before the expected return of hotter conditions at the end of the week.

Prime Minister Scott Morrison visited the Rural Fire Service (RFS) headquarters in Sydney, after returning on Saturday night from a holiday in Hawaii that drew sharp criticism as the wildfires crisis in his home state deepened.

After the deaths of two firefighters Thursday night, Morrison announced he would return home early, and on Sunday he acknowledged his holiday had caused anxiety.

"I get it that people would have been upset to know that I was holidaying with my family while their families were under great stress," Morrison said.

He also addressed his conservative Liberal-National coalition's climate policies, which his government has been forced to defend following the severity of this year's bushfires. Morrison said there was no argument that there is a link between climate change and weather events around the world.

Commented [PU1]: Scepticism

"But I'm sure people would equally acknowledge the direct connection to any single fire event is not a credible suggestion to make that link," Morrison told journalists.

Earlier this month, Australia drew criticism at a U.N. climate summit in Madrid for its climate-change policy of using old carbon credits to count toward future emissions targets.

Commented [PU2]: Calls for

Commented [PU3]: Market based mechanism

Australia is one of the world's largest carbon emitters per capita because of its reliance on coal-fired power plants. It has pledged to cut carbon emissions by 26% from 2005 levels by 2030, but critics accuse Morrison of paying lip service to that commitment.

Commented [PU4]: Calls for

Morrison recommitted to those policies, which he took to a general election in May, on Sunday.

7.5 SABC 14

Title: US, Australia, Saudi Arabia pushing back on enhancing climate action	Website: SABC
Author: Noma Bolani	Search word: climate change
Date: 12 Dec 2019	Article #: 14

US, Australia, Saudi Arabia pushing back on enhancing climate action

The United States, Australia and Saudi Arabia are among countries pushing back on enhancing climate action ambitions by 2020.

In addition, they're also against increased funding to fight climate change.

This has resulted in a deadlock on negotiations for developed countries to finance support for the Global South.

South Africa's Barbara Creecy is currently facilitating the negotiations.

Africa, the Carribbean and others under developed regions want the developed world to agree to pay for loss and damage caused by climate change in the Global South.

Countries which are against the sought amendments on Article 6 have been arguing that this would be a review of the Paris Agreement.

But the United Nations has called on all countries to enhance their reduction targets by the end of 2020.

And the main goal at COP25 for environmentalists and scientists is to ensure that a final document is agreed upon for the mechanisms to support adaptation in the developing world.

Commented [PU1]: Reluctance

Commented [PU2]: Reluctance

Commented [PU3]: Monetary

7.6 eNCA22

Title: November 2019 was joint hottest on record: data	Website: eNCA
Author: AFP	Search word: climate change
Date: 4 Dec 2019	Article #: 22

November 2019 was joint hottest on record: data

PARIS - Last month was the joint hottest November in history, satellite data showed on Wednesday, marking six consecutive months where the world either broke or equalled record temperatures.

The European Union's Copernicus Climate Change Service said global temperatures were 0.64 Celsius warmer than the November average from 1981-2010, and equal to the same month in 2015 and 2016.

With the exception of the eastern United States and Canada and parts of central Asia, most land mass saw above-average temperatures last month.

Europe's autumn (September-November) was 1.1C hotter than the historical average, Copernicus said.

The United Nations on Tuesday said that 2019 is on course to be one of the three hottest years on record, and could break the record for the hottest non-El Nino year.

The World Meterological Organization said it was virtually certain that the 2010s had been the hottest decade in history.

Commented [PU1]: Scientific findings